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Integration of Stock Exchanges in Europe, Asia, Canada and the U.S.

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INTEGRATION OF STOCK EXCHANGES IN REGIONS IN EUROPE, ASIA, CANADA, AND THE U.S.

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INTEGRATION OF STOCK EXCHANGES IN REGIONS IN EUROPE, ASIA, CANADA AND THE U.S.

I. INTRODUCTION

Assistance to develop stock markets in countries around the world needs to widen its perspective. Now technical help is largely at the level of the exchange and the country. This is an important part of the story, but only one part. Development policy should reflect the competitive terrain of the exchange. For many exchanges, this terrain is a geographic region that is not congruent with the boundaries of a single nation. Only a small part of policy and technical assistance now reflects this reality.[1] To ignore it could lead to disequilibrium in the number and function of exchanges.

This paper reports preliminary findings of a study of the integration of stock markets within various regions of the world and within federal states. We report and evaluate integration efforts for multi-country regions in Europe (the European Union), Asia (Southeast Asia and Hong Kong/China), and the Middle East. We report and evaluate single-country efforts in Canada, the United States, India, and Germany. A companion paper reports for Latin America, plus Mexico and the U.S. These two papers are organized primarily by region. Other parts of our study give topical analysis such as lessons for listing rules or trading systems.

Stock market integration means, to us, that investors can buy and sell shares in those markets without restriction and that identical securities can be issued and traded at the same price across the markets after foreign exchange adjustment.

A region can be either contiguous nations bound by trade and other links or a single nation with multiple exchanges in a federal system that allows its states to pursue different laws and policies toward capital markets. Although stock markets in one country often share many common features (e.g., a single system of laws or accounting), they also face important practical problems of integration.

We want to understand the logic of regional activity for stock exchanges because much of the competition among exchanges occurs at that level. Policies designed to improve the efficiency of even a single stock market must be based on a good understanding of stock market competition. Only a few stock exchanges in the world have the size and liquidity to be global markets. Most other stock exchanges serve a customer base of investors and issuers drawn mainly from the surrounding region. Often these smaller exchanges have important links with a larger exchange in the region (such as the Mexican Stock Exchange's links with the New York Stock Exchange (NYSE)). These regional markets and links among exchanges serve important economic functions.

[1] For an example of assistance that reflects this reality, see the role of the S.E.C. in COSRA, in Latin America.

Regionalization here refers to the observed tendency of stock exchanges in a region to cooperate as well as compete with one another. Regionalization is not necessarily an alternative to integration into global markets. Indeed, it can be an integral part of the move toward global financial markets. As used here, regionalization falls short of the idea implicit in such concepts as customs union, which suggest that some group of countries appropriately combine and exclude others, often through artificial barriers.

Regionalization is relevant for stock exchanges in developing countries. Although many countries have inaugurated stock exchanges, it is not clear that similar exchanges in each country in a region provide the most efficient mechanisms to raise risk capital.

Take the exchanges of Southern Africa as an example of the problem. The Johannesburg Stock Exchange (JSE) ranks as about the 10th largest exchange in the world, by market capital. Given existing links of trade, labor, and direct investment between South Africa and other countries in Southern Africa (from as far north as Zambia), one could imagine that the JSE could serve as the stock exchange on which the shares of many large and medium-sized companies in Southern Africa would be listed and traded. Exchanges elsewhere in the region might specialize in listings by smaller firms or foreign firms or commodity extracting firms, for example. This is not happening now.

The stock markets in Southern Africa, which include exchanges in Botswana, Malawi, Namibia, Swaziland, Zambia, and Zimbabwe in addition to the JSE, cannot find their appropriate role today. If they were allowed to cooperate and compete with one another, they would do so. But regional politics and government policies have prevented this. Indeed, a country's stock exchange will often seek barriers to protect it from competition from other exchanges.

A range of policies creates barriers. In the abstract, a large Zambian state-owned company about to be privatized, for example, might contemplate listing in both Johannesburg and Lusaka. Today, it faces many barriers to doing so, starting with exchange controls in South Africa and including different listing and disclosure requirements; structural rules for financial intermediaries; rules and systems for trading, clearance and settlement, and payment; and systems to disseminate data. The story of Southern Africa could be repeated with slight modifications for many regions. We use Southern Africa in this report to suggest ways in which findings might be relevant to a region.

It turns out that in several regions exchanges and their regulators, confronting these barriers, have adopted different ways to deal with them. Capital markets in a region like Southern Africa would benefit from understanding how linkages in other regions of the world have developed. We believe the lessons are even more broadly relevant, that policy makers in industrial as well as emerging markets will benefit from knowing about these efforts.

Our major findings are that:

- Integration at a regional level is more advanced within single country regions, suggesting the importance of the institutional environment (including government policy and the supporting infrastructure of law, regulation, and accounting systems).

- Regional integration is particularly difficult even in single-country regions. It opens the door to head-to-head competition between exchanges with the same prospective investor and issuer base. They are usually in the same time zone, so even the prospect of after-hours cooperation is unavailable.

- Governments do best removing barriers. The most promising areas for government action are removing official barriers, removing market barriers resulting from monopolistic or oligopolistic power, and providing a common threshold within the region for prudential and structural rules.

- Even removing barriers does not guarantee full integration. Basic trading systems (such as auction- or quote-driven systems) ultimately determine how much transparency is possible.

- Governments have a harder time imposing on the markets institutions that are supposed to support integration. These include systems to promote uniform trade and data flows, which would seem obvious candidates for official help. Since private firms should supply these services if demand exists, perhaps the best government can do is to allow or encourage the private sector to take the initiative.

- It may be easier, at least in certain circumstances, for the government to create a competing exchange than to urge exchanges to integrate. This occurred in one case, with some success so far.

The paper has five main parts. First, to set the stage, we review the literature about stock market integration. Second, we give an overview of the study. Most of the paper examines the degree of integration and factors increasing or decreasing it in multi-country regions and then in single-country regions. Finally, we draw conclusions from a comparison of the regions.

II. LITERATURE REVIEW

Despite the work about the integration of stock markets,[2] very little has been written about integration at a regional level and only some of it is useful to our study. The literature focuses on global rather than regional integration and much of the regional analysis is, at least for our purposes, superficial. The literature rarely addresses issues of stock market integration at the level of specificity that interests us.

The literature is, even so, useful to our study in several ways. First, it suggests hypotheses about the extent of integration to expect at a regional level (Part B below), even though the data and techniques it offers to measure integration among stock markets--co-movement among countries' indices--are at too high a level of aggregation for our study. Of course, managers of international portfolios often use aggregated measures to guide investment decisions. They are interested in the diversification and volatility of their portfolios and often place their bets at market or country level, so the measures help them. They are not our audience, and we are less interested in their activities than those of investors in such regions as Southern Africa.

The opposite of integration is segmentation, which the literature defines and for which it suggests causes (see Part C). The barriers to integration, in the form of market conditions or government policy, could be the object of remedial action at the regional or national level. Our problem is that these articles rarely seek to analyze the causes of segmentation.

The literature identifies market techniques that increase integration, occasionally analyzing them in a regional context (see Part D). These articles are very interesting to us, though few in number.

Finally, a very small set of authors has examined cooperation among stock markets in a region and opportunities for government policy to support the markets' development (Part E). These are most directly useful for us and even fewer in number.

A. DETERMINING THE EXTENT OF REGIONAL INTEGRATION

Integration worldwide is the subject of great debate. The range of findings is broad. A sample includes: the world market is not integrated (King and Sentara 1994); industrial countries' markets have been integrated for a long time but those in emerging countries have not (Cashin, Kumar, and

[2] See, for example, King, Sentana, and Wadhwani (July 1994), which examined the monthly returns from 1970-1988 on 16 exchanges of OECD countries. The authors concluded that the appearance of a trend toward integration over this time period might simply be a transitory correlation due to the 1987 market crash worldwide. They could not explain more than a small proportion of market covariance from measurable economic variables. Their findings were "consistent with the view that global stock markets are not integrated."

McDermott, November 1995; Claessens 1995); markets in some industrial countries, notably Japan, were less integrated with those in other industrial countries in the past but have become increasingly integrated (Chou and Ng August 1994).

We, however, are interested in integration at the regional level. The literature offers some definitions of region, defines integration and proposes various measures of it, and examines regional integration in a few cases. These pieces follow.

1. Definition of region

The definition of region is loose. A region may consist of nearly contiguous nations, either a group such as the countries with the major equity markets of Europe (Chou, Ng, and Pi August 1994) or simply two countries, such as Mexico and the United States (Domowitz, Glen, and Madhavan September 1995). Alternatively, a region may be a large group of developing countries and an industrial one, such as Latin America and the United States, or Pacific Asia and Japan (Cashin, Kumar, and McDermott November 1995). Finally, a region may include countries that are quite separated, such as Japan, Canada, and the U.S.

Without sinking into the debate about optimal currency areas, free trade areas, and common markets, we can note that the finance literature does not seek to relate regions to trade blocs in any systematic way, although some writers acknowledge the relevance of trade broadly. This is of interest, because one of our regions, Southeast Asia or ASEAN, did not qualify as a *de facto* trade bloc according to a study of regional trade in Asia (Frankel and Wei 1995).

For our purposes, this plastic definition allows some latitude to include a few or many countries in the regions we examine. The second definition of a region is of interest for our study because it recognizes that a special relationship can exist between a major exchange in a large region and many smaller exchanges in the region. In Southern Africa, the Johannesburg Stock Exchange (JSE) may have the potential to play the leading role, analogous to the New York or Tokyo markets in their regions.

2. Defining and measuring integration

A common definition of integration is that assets in different equity markets "with perfectly correlated rates of return have the same price regardless of the location in which they are traded." (Gultekin, Gultekin, and Penati September 1989). The problem with this definition is that it is very difficult to identify the equivalent securities across countries. Hence our definition on page one.

How one measures integration at any level, regional or global, is largely agreed by the econometricians, with refinements offered by some.[3] One source (Cashin, Kumar, and McDermott

[3] Specific tools for statistical analysis, and length and frequency of observationsvary greatly. We are

November 1995), summarizing the literature, said that it is well established ... that the greater the international integration of equity markets, the higher the degree of correlation among national equity prices. ... Cointegration methodology, in particular the Johansen (1988) cointegration tests, ... assess the extent to which equity prices have tended to move similarly across countries and regions in the long run. The assessment as to whether national equity prices are cointegrated is equivalent to testing whether there are linear combinations of these indices which will converge to stationary long-run equilibrium relationships.

In measuring integration, one should distinguish between short- and long-term correlations. The fact that short-term correlations among stock returns are low may not capture longer-term co-movements. The solution is to separate stock prices into two components: temporary (short-term returns) and permanent (long-term returns). Chou and Ng (January 1995), who summarize the literature, found distinct correlations, short- and long-term, among weekly data from stock market indices in the U.S., U.K., Japan, France, Germany, and Canada. Applying this to regions, one could observe substantial short-term variance between markets in a region, yet discover long-term correlation.

In measuring integration, one should also be alert to the possibility that two markets are related through one or more other markets. This means "the equilibrium price must involve multiple stock market prices" (Chou, Ng, and Pi August 1994). In Southern Africa, findings that prices correlated on the Swaziland and Namibia exchanges could reflect their integration with the JSE.

3. Integration at the regional level

The findings of the few regional studies suggest no simple trend toward integration, particularly in the last decade.

A study of the "region" of Europe questioned the convergence of its equity markets (Fraser, Helliar, and Power 1994). The researchers compared the excess returns (actual returns less the risk-free rates) in twelve industries across exchanges in five countries: Frankfurt, Paris, and Milan as "core" European exchanges, London as a "peripheral" European exchange, and New York as a control. They disaggregated by industry because investors arbitrage more easily at the industry than the market level. They examined monthly price indices, by industry, from 1974 to 1990. They found more convergence between the London and New York exchanges than between London and the three European exchanges. This may suggest London and New York are world class exchanges and the others are regional. Although some industry markets converged more than others, they found no strong differences between the broad sectors of consumer goods, capital goods, and financial services. They admitted they had not explained why convergence would occur or not. They are not alone. Most of these analyses of integration do not seek to explain its causes.

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less concerned about these because we do not intend to make comparative statistical analyses.

An exception that did look at causes of segmentation is a study that found the Canadian and U.S. equity markets are only partly integrated (Koutoulas and Kryzanowski 1994). It concluded that, in addition to U.S. leading indicators, purely domestic factors influenced Canadian markets, such as the term structure of interest rates, and purely international factors, such as eurodeposit interest rates, also influenced Canadian markets.

In a study of stock indices in six industrial countries, Chou, Ng, and Pi (August 1994) sought evidence of regional cointegration in three broad regions: Europe, Pacific Basin, and North America. Only six countries were examined. The authors tested weekly data from 1976 to 1989, and broke them into two periods (at 1983) to explore trends. They tested values in both local currency and U.S. dollars. They found:

- Stock markets in Europe, consisting of the U.K., France, and Germany, were cointegrated from 1976 to 1989. The results held whether one tested prices calculated in local currencies or U.S. dollars. Note that this contradicts the findings of Fraser et al (to which we return shortly).

- The Pacific Basin, consisting of the U.S., Canada, and Japan, were cointegrated over the 13-year period.

- For the North American group, the U.S. and Canada, the authors could not reject the null hypothesis of no cointegration for the entire 13-year period, but could reject it in the 6-year period from 1983-1989. This suggests the markets became integrated over time.

A more discriminating analysis examined more countries and used instruments peculiar to each region to show "significant common predictable components within" each region that "varied across regional markets and ... subperiods" Cheung, He, and Ng (December 1995) used five similar instruments in each region to predict excess returns in each region. Excess returns were the differences between returns on national or regional indexes and interest rates on short-term government notes (the risk-free rate) in the dominant domestic financial market of the region (the U.S., Japan, or Germany). The notion was that short-term rates, yield spreads, and dividend yields, for example, could predict returns on stock. They examined for "evidence of ... common movement and interaction among national stock markets" in each region over three periods: 1970-91, 1970-80, and 1981-91. Co-movement would suggest common linkages. They found "strong evidence of common predictable components in" each region, but the strength varied:

- The European region showed stronger co-movement in 1970-80 than 1981-91. The authors attribute this to exchange rate instability in the 1980s. The region consisted of Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Spain,

Sweden, Switzerland, and the U.K. This finding offers yet another cut on the apparent contradictions between the Fraser and Chou studies.

- The Pacific region showed stronger co-movement in 1981-91 than the earlier period. The countries were Australia, Hong Kong, Japan, and Singapore/Malaysia.

- North America, which consisted of Canada and the U.S., also showed stronger co-movement in 1981-91 than earlier.

Although the authors demonstrate the regional linkages, they suggest, rather than prove, reasons for the links.

A third study examines groups with developing countries more recently, defining regions of only a few countries each (Cashin, Kumar, and McDermott November 1995). The authors analyzed weekly closing prices of national indices in 13 countries, 6 of which were developing, over six years from January 1989 to March 1995. They divided the data into two periods, 1989-90 and 1991-95.

- The Americas region--Brazil, Mexico, and U.S.--was cointegrated.

- Latin America, consisting of Brazil and Mexico, showed increasing integration. The indexes were independent in the first period and cointegrated in the second.

- Asia includes Thailand, Malaysia, and Korea. In the earlier period, the indices were stationary, so the authors could not obtain information about long-run equilibria. In the later period, they became non-stationary and had at least one long-term equilibrium relationship [p. 17].

- The Asia-Pacific I region--Japan, Australia, Thailand, Malaysia, and Korea--was cointegrated.

- Europe is France, Germany, U.K., and Spain. These markets have been cointegrated for years.

The authors' comparisons make several points.

- Links are stronger within the European region and the Americas region than the Asia-Pacific regions, but the latter's linkages grew during the second sub-period.

- These regional links among developing countries are stronger when the region includes an industrial country (such as the Americas, which includes the U.S.).

- The cointegration means that when a shock occurs within the markets, it takes about 6 months for the markets to return to their underlying equilibrium.

The different findings (and analytical tools) raise questions for us about how to demonstrate the impact of policies designed to integrate markets in the region. For example, the European Union issued a Public Offer Prospectus Directive in 1989 to harmonize disclosure standards. It took steps to integrate quotation and trading systems. These steps were part of a broader initiative to create a single market. How effective has it been? These quantitative studies do not help us answer the question. Their time horizons are not geared to the 1989 change of policy. They do not include all the EU countries. They offer conflicting conclusions about the extent of integration, having used different statistical tools. A major problem is that their data are too aggregated, since they consist of stock indices.

B. TYPES OF MARKET SEGMENTATION

Individual barriers to integration of stock markets may segment the markets significantly, by increasing costs to some or all investors a lot, for example. We are less interested in the general literature,[4] which distinguishes between one market and the rest of the world, and more concerned with the analysis of barriers that allow us to draw lessons for Southern Africa and other regions because the barriers affect regional integration. Barriers in Southern Africa that receive some small attention in the literature include restrictions on foreign ownership (found in Zimbabwe), deficiencies in cross-border clearance and settlement within a region (a problem throughout Southern Africa), and barriers to multiple listings.

Market segmentation due to restrictions on foreign ownership of shares generated economically and statistically significant stock price premia on shares foreigners could own in Mexico (Domowitz, Glen, and Madhavan October 1995). The Mexican government required firms to issue multiple classes of stock. One class, unrestricted, could be owned by foreign or domestic investors. The other was restricted to domestic investors.[5] This resembles Zimbabwe's rules, which limit foreign acquisition to 25% of shares traded on the exchange, but do not require two classes of stock. In Mexico, the study found, the size of the premia varied: premia were higher for shares in companies with high market capitalization which attracted foreign investors presumably because they were more liquid. Premia were lower for firms with a smaller market cap. The premia grew as foreign demand grew. They declined as foreign exchange risk rose, since foreign investors' demand for the shares fell. The data consisted of 24 daily equity series and 46 weekly equity series issued by 21 firms. The series ran from 1990 through 1993. While this study was not of a region, the U.S. was the major source of foreign investor interest during the period when foreigners accounted for over 27% of all holdings and 75% of trading.

[4] See, for example, Alan Alford, "Assessing Capital Market Segmentation: A Review of the Literature," in Stansell (1993).

[5] Other classifications distinguished between individual and institutional investors.

Varied systems of clearance and settlement can segment markets in a region. In a study of European systems, Giddy, Saunders, and Walter (July 1995) argued that a centralized system is optimal in a region if, across countries, shares are "like products," (meaning "sufficiently homogeneous financial contracts"). But, they said, national systems are better if European stocks are nationally distinct due to three factors: regulations, institutions, and currencies. They concluded that national monopolies are not major barriers to integration in Europe. They examined the three factors to determine if European equities were sufficiently homogeneous. The many differences they found led them to conclude that centralization was neither ideal nor likely soon. Their study is useful to our study for its analysis of the economics of various elements in the "trading and settlement value chain" and for its analysis of the regulatory and institutional barriers.

Laws and regulations can also segment the market. We have found no analysis of this for regional markets. However, overviews exist of securities laws in a few regions. For industrial countries, which include much of Europe, the OECD's study of the organization and regulation of securities markets (1995) provides this overview. For Asia, the Securities Industry Association identified market access restrictions faced by U.S. securities firms (March 1994). These help us identify possible regulatory barriers within these regions.

Analysis of the barriers to integration of emerging markets generally also helps us identify important regional barriers and solutions. In an econometric study of 19 emerging markets, Bekaert (1995) examined the effect of several types of barriers: (a) direct restrictions on foreign ownership, (b) exchange and capital controls on investment and repatriation (and taxes that have the same effect), and (c) regulatory and accounting weaknesses that could affect information, settlement, and investor protection. He concluded that exchange rate controls and weak regulation and accounting were significant barriers. He also identified other *de facto* barriers, such as poor credit ratings and high and variable inflation. Apparently the existence of country funds circumvented the impact of limits on foreign ownership. He acknowledged the limitations of his econometric analysis.

C. MARKET TECHNIQUES OF REGIONAL INTEGRATION

Techniques to surmount segmentation evolve in the marketplace almost as a matter of course. We are interested in techniques that could be useful in regions like Southern Africa. These are rarely analyzed in a regional context, however. American Depositary Receipts (ADRs) for shares of Mexican issuers are a partial exception, reported below.

Domowitz, Glen, and Madhavan (September 1995) studied the impact of ADR listing in the U.S. on the Mexican stock exchange.[6] An ADR represents a fixed number of foreign shares or bonds

[6] In 1993, 26 of the 884 equity securities traded on the Mexican Stock Exchange were also traded as ADRs. These 26 shares were issued by 16 very large firms. The authors examined trading data from September 1989 through July 1993. They used a control group of 10 other shares to check for possible economy-wide effects on the ADR-

(for example, 20 L shares of the Mexican company Telmex) that are held in trust. The ADR is issued and traded in the U.S. It is attractive to a foreign issuer because the disclosure rules may sometimes be less onerous than if the shares themselves were issued in the U.S., and yet the security gains access to the large U.S. market. The ADR is attractive to U.S. investors because it is denominated in U.S. dollars, is liquid, clears easily, and may offer a play on a foreign market. ADRs for Mexican companies are among the most traded securities and have among the highest market capitalization of any shares on the NYSE. The underlying Mexican shares that are not held in trust continue to be traded in Mexico. Trading in ADRs in the U.S. and the shares in Mexico is linked.

If depositary receipts might circumvent some of the barriers in Southern Africa, a question is how they would affect the markets of the region. One can imagine South African Depositary Receipts (SADRs) trading on the JSE and based on shares traded in neighboring markets. The study by Domwitz et al. sheds some light on the local impact. The authors listed the expected dangers: order flow shifts to the most liquid market (the NYSE for Mexico, the JSE in Southern Africa); trading fragments with the shift, presumably because the markets are not well linked; on the home market, prices become more volatile, bid-ask spreads increase, and trading volume falls. Domestic securities companies, particularly any market makers, suffer from competition with superior foreign firms.

The actual effect on Mexico was more complex than expected. Shares not available to foreigners before ADRs were introduced were not hurt afterwards when foreigners could buy them through ADRs. The negative effect was limited to shares available to foreigners before ADRs for those shares were introduced. For these shares, volatility rose and liquidity fell after ADRs appeared. However, the implicit bid-ask spread also fell, to the benefit of buyers and sellers and at the expense of the financial intermediaries now competing with foreign firms. The Domwitz, Glen, and Madhaven (September 1995) study suggests that ADRs bring both costs and benefits to the home market: "international listing embodies aspects of both increased competition and the possibility of order flow diversion."

More generally, cross listing is a device to tap multiple markets that may be more or less integrated. A recent study (Saudaragaran and Biddle 1995) found that when multinational companies decided to list on more than one exchange, they were significantly influenced by levels of financial disclosure and levels of exports to the country. Their study examined 459 firms with at least one foreign listing on one of nine stock exchanges in eight industrial countries in 1992 (this was not a region, in our sense). They surveyed 200 people to measure perceptions of reporting and regulatory costs of foreign listings. They found that a firm was more likely to cross-list on exchanges that had lower disclosure requirements than its home exchange and that had larger markets for its products. For a region like Southern Africa, this confirms a tension: South Africa, as the obvious location for cross-listing, is attractive in its greater number of investors, and unattractive in its higher disclosure requirements.

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related securities.

The relationship between stock exchanges in a single country may lead to techniques of integration of interest to us. U.S. exchanges offer examples from their competition. The Cincinnati Stock Exchange recently developed a fully automated exchange that has no trading floor or specialists and draws trading volume from the NYSE, further integrating the U.S. markets. Smaller exchanges act as back-up sites for trading if some disaster strikes another exchange. (See Brennan (1994) and SEC Market 2000 (1994).) But in the U.S., at least, Congress made these integrating activities possible by legislative action. We examine this below. Government policy may often be important for market techniques to occur.

D. GOVERNMENT POLICY AND REGIONAL COOPERATION

Almost nothing has been written about what governments can or should do to facilitate regional integration, which is our subject. A non-quantitative study for UNCTAD of opportunities for regional cooperation among stock exchanges was made by Kalotay and Alvarez (February 1994). They identify preconditions for cooperation, examples of it, and the major players. The literature describes action by the U.S. Congress to unify the U.S. markets. An initiative for cooperation among regulators in the Western Hemisphere produced guiding principles to help coordinate, if not harmonize, supervision.

The following conditions are identified and briefly discussed by Kalotay and Alvarez as necessary for cooperation to succeed:

1) Action by private entities (which presumably could be facilitated by government action):

- establish regular channels to exchange information among markets;
- harmonize the upgrading of technology in order to eventually create a linked regional electronic trading and settlement system;
- create links among trading processes across countries;
- create regional instruments, such as warrants or depositary receipts; and
- create regional country funds.

2) Action by public agencies to harmonize:

- regional capital account convertibility;

- regional clearing and settlement arrangements[7];
- taxes within the region; and
- regulation and supervision regionally, using international standards.

The UNCTAD study concludes that regional initiatives are required if regional markets are to integrate. It urges regionalization to gain economies of scale, to deepen markets and reduce price volatility, and to permit portfolio diversification. Domestic markets, however, must also be strengthened.

Types of regional cooperation identified by Kalotay and Alvarez include:

- Cooperation arrangements between supervisors. For example, Argentine and Brazilian supervisors agreed to permit cross-border transactions and were followed by an agreement between the Sao Paulo and Buenos Aires exchanges.
- Cross-listing.
- Preferential treatment of investors from within the region--many examples are given, but it is not clear that they enhance welfare.
- Harmonization of tax rules--very little has been done.

The major players in regionalization efforts are identified and briefly described by Kalotay and Alvarez:

Regional private actors:

- Caribbean Stock Exchange, 1991
- Ibero-American Electronic Stock Exchange project, 1990
- Association of Central American Stock Exchanges
- Union of Arab Stock Exchanges
- East Asian and Oceanian Stock Exchanges Federation, 1982
- African Stock Exchanges Association, 1993

[7] The study by Giddy, Sanders, and Walter (July 1995) identifies and evaluates in much more depth areas for government action to improve clearance and settlement in Europe.

- Federation Internationale des Bourses de Valeurs (FIBV), a global group

Regional public actors:

- MERCOSUR (Argentina, Brazil, Paraguay, Uruguay)
- Supervisory agencies (Andean Group)
- Council of Stock Market Regulatory Authorities of the Intern Americas (COSRA)
- International Organization of Securities Commissions (IOSCO) [global]
- International Accounting Standards Committee (IASC) [global]

This is useful background for our study.

Multiple stock exchanges in a single country, previously decentralized, may integrate. Lessons from their integration can be useful for regional integration. Kalotay and Alvarez (February 1994) identify and describe several countries:

- India, with over 20 local exchanges
- Brazil, with 9

Our study examines Germany, Canada, and the U.S. as countries with multiple integrating exchanges, in addition to India.

For the U.S., the literature describes the National Market System (NMS) that the U.S. Congress mandated by law in 1975. The NMS obliged exchanges trading qualified securities to create data processing and communications links to execute orders. The debate leading to the NMS--such as the proposal for a national electronic book with automatic execution--is instructive for our study, as are the ensuing efforts to keep the system fair. Brennan (1994) concludes that the evolution of the NMS fragmented the market and changed the competitive balance among the exchanges. In a sense, this was intended by the policy.

Cooperative efforts by regulators within a region appear not to have been evaluated yet, but good descriptions of their activities exist, at least for the Western Hemisphere. The 25-country Council of Securities Regulators of the Americas agreed in May 1995 to detailed principles of effective market oversight and steps to fight corruption and improve market structure (such as quote- vs. order-driven trading systems) and capital formation in member countries. The principles are elaborate, but do not set a timetable or measures of compliance, which would probably be impossible for such a large group of countries to accept. Meeting in June 1994, the members agreed to cooperate to fight fraud (including a multilateral arrangement) and supply information to ensure compliance with domestic securities laws, and to build a mandatory system of corporate disclosure. COSRA members also considered basic principles for clearance and settlement, transparency of transactions, cross-border surveillance, and audit trails.

E. CONCLUSION

Only one document, the UNCTAD study, is directly on point for our study. Other studies help guide aspects of our work. Some offer markers to evaluate the effect of activities by firms or governments designed to help integrate regional markets. We are breaking new ground.

III. OVERVIEW OF INTEGRATION IN EACH REGION

We examined stock markets in eight regions, four groups of countries and four federal states: the European Union, Southeast Asia (ASEAN), China/Hong Kong, the Mid-East (areas within the old hegemony of Turkey), Canada, India, Germany, and the U.S.
Each region contains many stock exchanges. The following table gives an overview of the groups, the degrees of integration by our two measures, and major factors in integration.

The Regions					
Regions	**Number of Stock Ex-changes**	**Degree of Integration**		**Major Factors in Integration**	
		Cross-Listing	**Funds Flow***	**Official**	**Private**
Country Groups					
European Union	35	Low-moderate	Moderate	Initiatives of EC Commission, sub-regional gov't groups	Stock exchange cooperative arrangements
Southeast Asia	8	Very low	Low-moderate	Gov't/SE com-missions keep them apart	Private investors, intermediaries integrate
China/Hong Kong	3	None	None (officially)	Chinese gov't policy segregates, defines functions of each exchange, including HK.	HKSE cooperates with Chinese policy. Investors look for ways around the rules.
Mid-East	15	Very low	Unknown	Turkish initiative, but no substantive action	Exchanges are members
Federal States					
Canada	5	High	Moderate	Constitutional barriers	Small exchanges want protection
India	23	High	Moderate	Fed govt policy: NSE	National Stock Exchange
Germany	8	Very high	Low	Fed gov't policy to slowly	Frankfurt SE pres-sure

				integrate	
U.S.	7	Very high	High	Fed gov't policy to integrate in 1975: law, SEC regulation	Private systems permitted by SEC; institutional investors

* Measured by arbitrage opportunities on cross-listed securities, where possible.

In the abstract, our study should measure integration by the extent of cross-listing of shares of companies based elsewhere in the region and by the flow of funds to the exchange from investors based elsewhere in the region to trade in those cross-listed securities. Cross-listing carries a slightly ambiguous message. Companies often cross-list so investors in the new country can trade according to their local conditions. If later a country's investors can easily buy and sell shares traded abroad, a decline in cross-listing could signal more, not less, integration. One must read the two measures--cross-listing and cross-investment--together.

In practice, we could not apply the two measures uniformly across each region. Many stock exchanges identify the domestic and foreign companies they list but do not identify the home country of the foreign issuer. Most exchanges do not even identify shares as cross-listed on other exchanges. Most exchanges fail to publish data that allow one to identify cross-border investors from individual foreign countries in the region or elsewhere.

We solved these data problems as follows. For federal states, we relied on the high proportion of domestic investors on the country's stock exchange and the extent to which arbitrage opportunities existed for cross-listed shares. Large price differentials suggested that the country's investors were not taking advantage of arbitrage opportunities (if the differentials could not be explained otherwise, as by significant cost differences in using the exchanges). For multi-country regions, we relied on qualitative data when numbers were not reported.

Regional Exchanges and Types of Integration

Cross-Listing	**Cross-Investment Arbitrage**		
	Low	**Moderate**	**High**
Low	China/HK Mideast	Southeast Asia	
Moderate		EU	
High	Germany	Canada, India	U.S.

By these measures, we found that most multi-country regions are not now very integrated, as the table on types of integration shows. Only the European Union had a moderate level of cross-listing and regional flow of investment funds. The federal states were more integrated than the multi-country regions when measured by the extent of cross-listing. But when this measure was refined by the degree of regional funds flow, or arbitrage opportunities, it became clear that several of the federal states were not well integrated either. It is possible to satisfy one element of integration without satisfying the other. For example, Germany reports extensive cross-listing but substantial arbitrage opportunities that suggest limited integration. On the other hand, Southeast Asia has very little cross-listing and probably a much higher flow of investors' funds within the region that would permit arbitrage of cross-listed shares.

Government policy played a role in the degree to which markets in these regions were integrated (see the following table). Among the groups of countries, EU directives and EU

Government Policy and Regional Integration

Government policy toward regional integration	**Integration**		
	Low	**Moderate**	**High**
Oppose:	China/HK		
	Southeast Asia		
		Canada	
Neutral:	Mideast		
Support:	Germany		
		EU	
		India	
			U.S.

member governments policies promoted integration. The surprise is that these policies often did not achieve their objectives. On the other hand, the policies of governments in Southeast Asia and of the Chinese government deliberately managed access to their listed firms (or, put another way, their firms' access to foreign investors and their investors' access to foreign shares, including those from others in

the region). The table suggests that government policies do play a role, but not always with the degree of success the governments may have wanted.

The following sections sketch the degree of integration and factors affecting integration in each of the regions.

IV. INTEGRATION OF EXCHANGES IN MULTI-COUNTRY REGIONS

A. MULTI-COUNTRY REGIONS: EUROPEAN UNION

The following table lists the 15 EU countries in which the 35 EU exchanges are located and shows their relative size measured by market capitalization, trading, and number of listed companies in 1995. Large disparities exist. To make our analysis manageable, most of the comparative data concern stock exchanges in the U.K. (notably the London Stock Exchange), France (the Paris Bourse), and Germany (8 exchanges, but principally the Frankfurt exchange). The exchanges in Amsterdam and Stockholm were examined in less detail. For more information, see the companion Discussion Paper on this topic by Amir Licht.

Relative Size of EU Stock Exchanges, 1995

Country	Market Cap ($ mn)	Trading ($ mn)	Listed Companies
Austria	32,513	25,759	109
Belgium	104,960	15,249	143
Denmark	56,223	25,942	213
Finland	44,138	19,006	73
France	522,053	729,099	450
Germany	577,365	1,147,097	678
Greece	17,060	6,091	212
Ireland	25,817	13,241	80
Italy	209,522	86,904	250
Luxembourg	30,443	205	61
Netherlands	356,481	248,606	387
Portugal	18,362	4,233	169
Spain	197,788	59,791	362
Sweden	178,049	93,197	223
U.K.	1,407,737	1,020,262	2,078

Source: IFC Emerging Markets Handbook 1996.

1. Degree of integration and trends

The larger EU exchanges appear to have become more integrated, measured by listings, over the last six years, although the smaller ones may not have done so. Home country foreign listing data exist for exchanges in three of our countries--U.K., France, and Sweden. For these exchanges, we identified the new listings of companies from other EU countries from 1990-6, since new foreign listings are generally of shares already listed on their home exchanges. As the following table shows, in both London and Paris the ratio of new to old EU listings rose faster than the ratio for non-EU listings. By this measure, the three countries were more integrated with other EU countries in 1996 than in 1991, though the absolute size of Swedish listings is quite small. Paris and London became relatively more integrated with other EU countries than with non-EU countries. The fact that non-EU listings substantially outnumber EU listings is an ambiguous sign of regional integration. One might expect a higher number of listings from companies based in different time zones, for example, than the same zone. To the extent that the other EU exchanges are in the same time zone and one country's investors have relatively easy access to shares traded on other EU exchanges, then a local cross-listing of EU shares is not necessary to reach local investors.

Selected EU Exchanges
Home States of Foreign Listed Companies, 1990 and Change 1991-6

Exchange	Home State					
	EU Listings			Other		
	(a) As of 1990	(b) New '91-6	(c) % b/a	(a) As of 1990	(b) New '91-6	(c) % b/a
London	95	34	36%	305	84	28%
Paris	64	10	16%	101	7	7%
Stockholm	5	1	20%	5	1	20%

Cross-market investment seems significant within the region, certainly among wholesale investors. That is the appeal and threat of the international exchange in London, SEAQ-I. Scholarly evidence suggests cross-market arbitrage is more frequent between the biggest exchanges and less so for the smaller ones. Two recent studies showed that SEAQ-I is perfectly arbitraged with Paris but not Milan. Conversations with brokers suggest very few unexploited opportunities for arbitrage among the larger exchanges. This is consistent with frequent press reports about the competition between SEAQ-I and Paris and Frankfurt with London winning into the early 1990s, then losing.

2. Factors affecting integration

Three major factors contributed to EU exchange integration. One is market-based, the role of London as a competitive threat to continental exchanges. The second originates in government policy: the European Union, generally and in its policies to stock markets and financial intermediaries. The third major factor is specific stock market integration initiatives among EU countries. Each is discussed below.

The role of London and differences among the exchanges. Probably the most important factor was the nature of the competition among Europe's stock markets. In the late 1980s, compared to continental exchanges, London's SEAQ-I was more liquid, placed fewer constraints on issuers, and traded through dealers. London forced continental exchanges to modernize obsolete trading systems in order to survive London's competitive threat. Trading in many European shares listed in London migrated there. SEAQ-I offered continuously available market makers who would buy and sell the shares at quoted prices, committing substantial capital to maintain deep markets. This appealed particularly to wholesale investors, whose share of total trading continued to grow. The U.K. did not tax trading in non-U.K. stock, as did continental governments. London's competitors' successful steps to respond, taking effect in the early 1990s, integrated EU exchanges further.

The tug-of-war between EU exchanges affects transparency. Dealer markets like London and other North Sea countries are relatively opaque so that dealers and market makers can buy or sell large blocks of shares without disclosing the full extent of their interests. Auction markets are relatively more transparent before and after trading because bids, offers, and sales are all published (on the screen, as it were). This difference in trading systems affected integration in two ways. First, it affected the willingness and ability of exchanges to provide data vendors like Reuters with timely information. Exchanges want to profit from selling their quote, order, and trade data directly to users like brokers and investors or indirectly through the data vendors. Exchanges with more transparent trading systems can provide data more readily than the less transparent ones. As we see below in the discussion of the U.S. markets, trading systems play a crucial role in the ability of data distribution systems to deliver complete information about the full range of bids and offers in the market at any point. Second, the tension between the two types of exchanges in the EU led to a fight over public policy toward the appropriate minimum degree of transparency.

The role of the European Union. Stock market integration in the EU occurs in a cauldron of forces pushing member countries toward a much broader economic and political integration. Beginning even before the EEC took shape as a common market in 1957, these forces have done much to facilitate stock market integration, which is taking place relatively late in the process. Common

institutions, in Brussels, frame policy and supporting rules that defer to national agencies as much as possible. A policy of mutual recognition, based on agreed common principles, has guided the evolution of financial regulation since 1985. Although steps are being taken for a single currency and monetary union, no proposals are considered for a single securities and exchange system.

Directives from the European Commission (EC) resolve some of the difficult issues. The 1993 Investment Services Directive sets ground rules for investment firms and stock exchanges. These ground rules, and the controversy their drafting created among member states, are important for this study. The highlights include the following:

- The single passport allows for relatively free movement within the EU by a business, such as an investment firm, regulated in one EU member country.

- A "regulated market" could operate anywhere within the EU, even setting up remote terminals in other states. Members squabbled over the definition of regulated market because it gave any designee competitive advantages. Countries such as France tried to define it to exclude markets organized like SEAQ-I; the issue was not resolved.

- The Directive's standards for transparency in trading data (quotes, high and low prices, volumes, etc.) require less publication than was already required on the exchanges of important members.

- A major debate was whether the Directive should fix a single structure for all members' markets. If so, should it be a dealer, quote-driven system like that in London, or an order-driven system based on more publicly available information that allowed for automatic order matching, like that in Paris? The former was more appropriate for the wholesale market, with block trading by large institutional investors. This could be organized to cater to an international clientele. The latter fitted the needs of a retail market for small investors, more likely to be organized nationally. Both structures are permitted.

- The Directive allowed members to concentrate exchange activities in one national exchange.

Supplementing this Directive were others that addressed important issues:

- Would deposit-taking banks be permitted to act as underwriters, brokers, and dealers? Some EU members said yes (Germany had universal banks), others limited their banks to securities market operations through subsidiaries. Universal banks are permitted.

- Should common rules govern capital adequacy for financial intermediaries? This continues to pose difficult problems for the EU.

- Should members promulgate codes of conduct for financial intermediaries dealing with their customers? The EU did not resolve this.

- Should financial intermediaries from non-EU countries be subject to reciprocity or national treatment? The EU accepted the latter principle.

- Do mutual funds require a common form and rules? The EU created a form and provided for mutual recognition.

- To what extent should listing be harmonized? The EU standardized rules for admission to listing, then set a floor with mutual recognition for disclosure ("Listing Particulars"), then for public offerings.

- Should listed companies disclose major holdings? The EU answered yes.

- Should members have common rules about insider trading? Yes, said the EU.

These issues of access, market structure, and disclosure are at the core of any deliberate effort to coordinate market integration. They go to the notion of a level playing field. Many of these matters are discussed later in this paper.

The process by which these rules came into play was important. To the extent stock markets and financial intermediaries existed, their stakes had a profound effect on the ability of their governments to frame common principles. Relatively weak national securities laws and markets in Europe may have facilitated its evolution. The common rules, as they developed gradually over almost two decades, forced national securities regulators to cooperate.

Pan-European Integration Projects. The EC announced a vision of electronically linked stock exchanges in Europe in a White Paper in 1985. The notion was that linkage would lead to greater depth and breadth, enhancing the region's markets. A series of largely ill-fated projects ensued. Their goals and the reasons for their fate are of interest to this study.

- 1984: Electronic data exchange system among trading floors of member exchanges (IBIS). Disbanded in 1989.

- 1989: European Wholesale Market, based on SEAQ. Dropped.

- 1990: Eurolist #1, standardizing legal and accounting rules to enable the largest EU companies to be listed on EU exchanges. Dropped to pursue Euroquote.

- 1990: Common system to quote prices and report company data about the largest EU listed companies (Euroquote). It would automatically link EU exchanges, member firms, some supervisors, and others. It would automatically route, execute, and confirm orders and clear and settle trades. The venture was owned by leading EU exchanges. It never took off, since the U.K. did not want a competitor to SEAQ in trading and other countries said private vendors already provided data.

- 1995: Common listing vehicle, using a single set of documents, that allows the largest EU companies to list outside their home exchange (Eurolist #2). The Brussels Bourse operates it as the Eurolist Message Transfer System, with a computer hub in Brussels and terminals and display screens in member exchanges. It started operations with 59 firms, for exchanges in the 15 EU countries, plus Switzerland and Finland. By June 1996, 70 securities issued by 65 firms were listed this way on exchanges in 11 countries. Of the 70 securities, 61% were on three exchanges (Amsterdam, Frankfurt, and Stockholm) and only 6% on London.

- 1996: A NASDAQ-like screen-based exchange to trade shares of small and medium-sized firms (EASDAQ). Organized by European securities firms who had set up the European Association of Securities Dealers in 1994, EASDAQ will be a regulated market that actually lists shares, rather than simply quotes them. It began operations in late 1996.

- 1996: An arrangement linking the "New Markets" on various European exchanges (Euro-Nouveau Marche). Led by the Paris Bourse, several New Markets decided to harmonize their listing, disclosure, and trading rules, give joint roadshows, and link the markets for joint trading and data dissemination. Not yet implemented.

- 1993: Cooperation between the French and German derivatives exchanges extended to the underlying cash markets in 1995, giving a common computerized network to trade equities and their derivatives. But it collapsed when the Germans decided not to adopt the Paris Bourse's equity trading system and the French declined to use Frankfurt's electronic system for trading derivatives.

In addition, information is shared through the Federation of European Stock Exchanges (FESE), which represents the 15 EU countries, Switzerland, and Norway.

Cooperative ventures were pursued at a subregional level as well.

- 1990- : Nordic system consolidating data about quotes and transactions, provided by the Copenhagen, Oslo, Stockholm, and Helsinki exchanges and sold to European securities firms and data providers like Reuters or Telerate (Nordquote #1).

- 1991: A Nordic Bourse merging the four exchanges never got off the ground because the political member countries did not want to lose their national exchange.
- 1993: A Nordic system to support trading by allowing a broker on one member exchange (only the four) to indicate interest in a stock traded on another exchange. Despite the modest cost, below $500,000, and SEAQ-I as their common rival, the exchanges ended the project in 1995 after only 15 months. The members did not want to relinquish their monopoly positions over their own stock.

The efforts to cooperate, particularly those designed to develop a central electronic quotation system, have largely failed. In this long list, only the simplest vehicles to share trade data have progressed. In the EU, private vehicles could perform even this function. On other matters, such as projects to create EU-wide markets, national stock exchanges have not been prepared to relinquish their privileged positions. EASDAQ is too new to cite as a counter example. The EU track record suggests these policy initiatives to reduce barriers to competition would more effectively integrate the markets than policies designed to increase cooperation without reducing those barriers.

B. MULTI-COUNTRY REGIONS: SOUTHEAST ASIA

Stock exchanges in the six Southeast Asian countries include those of Indonesia (2 exchanges), Malaysia, Philippines (2), Taiwan, Thailand, and Singapore. Singapore's exchange had been the largest, but its dominance eroded:

Relative Size of Southeast Asian Stock Exchanges, 1995

Country	Market Cap ($ bn)	Trading ($ bn)	Listed Companies
Indonesia	$ 67	$ 14	238
Malaysia	213	77	529
Philippines	59	15	205
Taiwan	187	383	347
Thailand	142	57	416
Singapore	148	60	212

Source: IFC Emerging Markets Handbook (1996)

1. Degree of integration and trends

Cross-listing of instruments among exchanges in the region is very limited, with the major exception of Singapore. We identified only a few isolated examples of a company in one country in the region listing on another country's exchange. No regional shares were listed on the exchanges in Jakarta, Kuala Lumpur, Manila, Taiwan, or Thailand.

The Stock Exchange of Singapore (SES) is the exception. On the Main Board, most of the 32 foreign shares are secondary listings of Hong Kong firms; most have limited trading. Clob International, an over-the-counter market under the auspices of the SES, allows investors to trade securities listed on foreign stock exchanges. At the end of 1995, 112 Malaysian stocks, 10 Hong Kong stocks, and 7 others (from Taiwan and Australia primarily) were traded. Clob allowed investors in Singapore (and elsewhere) then holding shares in Malaysian companies to continue to trade them outside Malaysia, as they had been able to do before Malaysia withdrew. Clob added no Malaysian securities after 1990. It added others at the initiative first of the Singapore government and later of the exchange, but the most actively traded stocks continued to be Malaysian. Clob market capitalization was just over half that of the Singapore main board.

Depositary receipts for foreign shares--a variety of cross-listing--may be issued in several of the region's countries, but they are few in number. They existed in Singapore from 1994; issuers included two firms from Indonesia and a Thai firm. Taiwan in 1992 allowed depositary receipts as the only way to list foreign securities until late 1996; no foreign firms applied.

Several other indicia of integration are slightly outside our own indicators. Singapore set up a Foreign Board for primary listings of foreign firms at the end of 1995; this is not cross-listing because Singapore is the primary stock exchange. A plan to design a Regional Stock Index based on SES-listed foreign and domestic companies was announced in 1996. An intriguing and somewhat different approach to integration is the practice, still in its infancy, of a regional multinational allowing its subsidiary in other countries in the region to issue shares on the host market.

Regional cross-investment formally captured by the data appears to be very limited, but we question the reliability of the data. No country reports regional data. When a country reports total foreign investment, it would appear to be setting a limit on the amount that could come from within the region. That is, since total foreign investment in the KLSE and Bangkok exchanges has been below 20% of all investment, we should be able to conclude that regional investment is below 20% on each exchange too. The problem is that the data will not capture all foreign investors, particularly in countries like Thailand that limit foreign ownership. It is not uncommon for an investor from, say, Taiwan, to use a Thai businessman as a front to buy shares. Moreover, brokers based in one country in the region with offices elsewhere in the region are beginning to offer ways for investors in the other countries to invest in shares of home country companies. In 1994, for example, Malaysia's largest broker opened offices in

Manila and Hong Kong (as well as other Asian countries), from which it offered Malaysian stock to local investors.

Arbitrage opportunities as a proxy for cross-investment are not useful because the number of cross-listed shares is so very small.

Given the mobility of capital in the region, despite remaining exchange controls, we assume that regional cross-investment is at least moderate in general, despite the limited data, but that it can only rarely be made in a security traded on more than one exchange.

2. Factors affecting integration

Competition, not cooperation, drives and limits integration among the Southeast Asian exchanges. On balance, although some government policies promoted small efforts enabling exchanges in the region to cooperate, a far greater set of policies maintain impediments. Official and private players act on the principle that competition dominates the exchanges' relationships. This differs greatly from the approach in the EU. It is as though the Southeast Asian governments and exchanges expect and accept that each of the major exchanges constantly asks how it can take market share--in the form of listings and trading--from its neighboring exchanges. The sweep of regional investment across Southeast Asia would have a profoundly integrating effect if government policies did not erect and maintain barriers to protect local exchanges.

Factors promoting regional integration:

The idea of capital market integration in Southeast Asia is not new, but it has been hortatory.

- In 1978, a meeting between representatives of the stock markets of Indonesia, Malaysia, the Philippines, and Singapore resulted in an agreement to form the Federation of ASEAN Stock Exchanges. Thailand did not send a delegate but indicated support. Taiwan, not an ASEAN member, would not have been included. The report of the meeting expressed the optimistic hope for an ASEAN stock exchange one day. That hope never materialized.

- Much later, the Singapore Declaration of 1992 raised the prospect of stronger capital market cooperation as part of an effort to direct ASEAN economic cooperation.

- Presidents of stock exchanges in the region call intermittently for cooperation to facilitate cross-border trading. In 1993, for example, the SES president said that the time had come to promote intra-ASEAN markets. He saw the opportunity to cross-list and trade a handful of larger stocks on markets throughout ASEAN. In 1995, the president of the Thai exchange urged closer cooperation among exchanges in the region. He recommended collective action to boost poor trading volumes.

At a level of modest action, Southeast Asian and nearby exchanges established the East Asian and Oceania Stock Exchanges Federation (EAOSEF) in 1982, with members extending from Australia to Korea. Only in 1993 did EAOSEF move beyond general meetings to issues. That year it circulated country reports about regulating advertising by securities firms and the effect of equity derivatives on underlying markets. Disclosure was the topic the 1994 meeting in Bangkok. EAOSEF set up a working group to identify and explore issues of importance to member exchanges.

Competition from outside the region prompted credit rating agencies from Thailand, the Philippines, Indonesia, and Malaysia to form the ASEAN Forum of Credit Rating Agencies (AFCRA) in late 1995. Their goal was to enhance their competitive standing against international rating agencies that were entering markets in the region. To this end, they agreed to draft guidelines to standardize their rating methods. While this could have the long-run effect of enabling cross-listing and cross-investment within the region, each member represents a national market in which other members do not compete. The EU experience suggests that, if members were to try to enter one another's home markets, the forum would collapse.

The role of Singapore. Singapore, acting unilaterally as the financial center in the region, has done more to integrate the markets than these exhortations and other small steps toward cooperation. Each example of integration drawn above from Singapore represents an initiative of the exchange and financial authorities.

- SES relaxed listing requirements for foreign companies, both for when they chose the SES for their primary listing and for a secondary listing (which entails cross-listing). The problem was that local investors showed little interest in trading these foreign stocks, so turnover was low and the instruments illiquid.

- SES created a Foreign Board to list regional stocks (and infrastructure projects) that did not meet the Main Board standards. The idea was that because these would be primary listings, trading would be greater than in foreign shares on the Main Board, which were secondary listings.

- Unlike many countries in the region, Singapore does not generally restrict acquisition of shares by foreigners, although it does have dual quotations for a few firms whose articles of association limit foreign ownership, such as Singapore Airlines.

- Singapore levies concessional tax rates on certain income from trading foreign shares and charges no stamp duty.

- Clob was created in response to the Malaysian withdrawal from the Singapore-Malaysia exchanges.

The Singapore government wants the country's exchange to serve as a gateway for portfolio investors in the region. Obviously this extends far beyond investors from the region to include those from all other parts of the world. This is consistent with Singapore's special role since it emerged as a regional banking center in the late 1960s. The government appears to have played an important role in most, if not all, of these initiatives. The Ministry of Finance announced the creation of the Foreign Board and the regional stock index, both ostensibly the creatures of the Singapore Stock Exchange.

Governmental encouragement of cross-border investment. Some governments that limit foreigners' holdings of the shares of domestic firms have carved out exceptions to the limits. Thailand and Malaysia permit investment funds, in which foreigners may purchase shares but cannot hold voting rights. These funds are treated as domestic entities, rather than foreign, and so are not subject to the ceiling.

Financial intermediaries based in one country in the region began to operate in other countries as barriers restricting them started to fall. The restrictions affected either incoming or outgoing investments. Foreign securities companies were allowed to act as brokers, underwriters, and dealers in Taiwan in 1993, when the government somewhat relaxed entry requirements, for example. Singapore brokers are active in Malaysia. Limits on outward investment remained in place until quite recently. Local firms were permitted to open offices abroad in that same year in Thailand and Taiwan. Entry barriers in ASEAN have fallen only gradually and country-by-country, unlike what occurred in Europe.

Regional funds appear to have an integrating effect. Funds for countries in the region would have an integrating effect, since portfolio managers could move funds among the various countries depending on their performance. But this is a broader integration than regional, since the investors are from outside the region.

Exchanges' integrating activities. Stock exchanges in the region occupy the same or adjacent time zones and are open at about the same hours for their morning and afternoon sessions. The Philippines' exchanges are the outlier, given their location in an earlier time zone, and are only open in the morning. Otherwise the congruent trading times put the exchanges in direct competition with one another, making cooperation harder. Suppose the primary exchange for a listed company was asked to help another exchange in the region provide the secondary listing. The primary exchange confronts the possibility of losing trades in the stock to the secondary exchange. Southeast Asian exchanges do not appear to have identified any potential benefits that would offset these costs.

In short, the private sector, in the form of financial intermediaries, investors, and to some extent exchanges by their competition, help to integrate the region. Issuers do not integrate the region; they are not allowed to do so.

Factors impeding integration:

The dominant activity by governments and exchanges has discouraged the integration of exchanges in the region. Some actions had profoundly segmenting consequences: an example is the decision of the KLSE to separate from the Singapore Stock Exchange. Most barriers, however, are not aimed mainly at other regional exchanges but at all foreign involvement in domestic equity markets.

The most dramatic limitations on intra-regional investment concern foreign shareholdings:

- Ceilings on total foreign ownership of domestic shares: Indonesia (49%), Malaysia (informally 30%), Thailand (49%), Taiwan (ceilings are both in money value for individual foreign investors and portion of all shares, 10% total);
- Ceilings on foreign ownership of firms in strategic industries: Singapore (defense, banking), Thailand (banking 25%);
- Ceilings on inward and outward remittances associated with share trading (Taiwan);
- Foreign boards as the only place that foreigners can trade, up to some limit of each company's capital (Philippines, Thailand);
- Ceilings on foreign funds ownership of total equity in the domestic market (only 20% in Taiwan);
- Investment committee review and approval required for large foreign investors (Malaysia, for 15% of voting shares or M$5mm); and
- Articles of Association limit foreign shareholding (even Singapore has dual quotations for a few firms whose articles of association limit foreign ownership; Singapore Airlines, for example, has a 27% limit).

These barriers are not impermeable, since foreign investors in many countries learn how to work through local nominees. But they are barriers nevertheless, particularly when contrasted with the internal market of the European Union.

Beyond the limits on foreign investors are those on foreign securities. We found few. One was Taiwan's rule that depositary receipts were the only way a foreign company could be listed there until late 1996.

Outward investment by citizens is limited by Thailand. We did not find other examples.

Cross-border operations of financial intermediaries are restricted in various ways. Ceilings on foreign investment generally apply to foreign financial institutions, so that a broker from one country in the region would be limited in its efforts to establish a subsidiary in a neighbor. Membership in exchanges may be limited or prohibited for foreign brokers. No foreign members are allowed in the Philippine and Thai exchanges. Foreign or "international" members of the Singapore exchange are limited to dealing with non-residents or with small retail resident investors. Prudential rules, notably for capital adequacy, differ greatly around the region, but we do not know if this affects regional integration.

The EU internal market policy, by allowing financial intermediaries to move across borders, probably helps to integrate its stock markets. Those facilitating policies are absent in much of Southeast Asia. Host governments in the region, in contrast to those in the EU, offer no special concessions for players from elsewhere in Southeast Asia. They treat investors, issuers, and intermediaries from elsewhere in the region no differently than those from other countries. Barriers remain in most exchanges, even Singapore not excepted.

In sum, ASEAN exchanges remain segmented, largely due to government policies that limit cross-border investment and make cross-listing uninteresting. Singapore's initiatives, a competitive challenge that diverts order flow from other exchanges, have government support. But even these are relatively limited in their integrating effect. Because of this hostile environment, one never reaches such issues as whether trading systems would permit integration

C. MULTI-COUNTRY REGION: HONG KONG/CHINA

Three exchanges in the Hong Kong/China region are of interest for this paper. In China, the Shanghai Stock Exchange (SHSE) is larger than the other, Shenzhen Stock Exchange (SZSE). As the following table shows, both were founded in 1990. Both are much smaller in market capitalization, trading value, and shares listed than the third, the Hong Kong Stock Exchange (HKSE). We do not examine China's Securities Trading Automated Quotation system (STAQ), a prototype system allowing institutions to trade.

Exchanges in the Hong Kong/China Region (1995)			
Exchanges	**Market Cap. ($ bn)**	**Trading ($ bn)**	**Listed Shares**
Shenzhen	15	198	135
Shanghai	30	37	220
Hong Kong	304	104	542*

* Includes 518 domestic, 24 foreign, and 17 PRC companies.

1. Degree of integration and trends

The Hong Kong/China region, shifting now from two independent units to a single country, exemplifies the deliberate use of non-integration as a strategy to approach different segments of investors. Aside from China's designation of different exchanges to trade different types of shares, there is no formal integration. Chinese exchanges do not list foreign shares or depository receipts on them, even those from Hong Kong. Only Chinese shares permitted by the Chinese government can be listed in Hong Kong (or on the Chinese exchanges, for that matter). Integration is not found in cross-listing, since the shares of no single Chinese company are listed on more than one of the three exchanges in the region. Indeed, the simple listing of Chinese shares on any one of the exchanges is carefully directed by China as a one-way street to the outside world solely for designated Chinese firms. Integration, as defined in this paper, is only found in the flow of informal investment around the barriers and that is, of course, an unknown amount.

China is developing its stock markets with a very evolutionary strategy based on experimentation. Closed until recently and lacking firms organized to issue shares, China dipped its toe in the regional market in two ways, starting in the late 1980s. First were the backdoor listings. A Chinese firm would take over a listed Hong Kong company in financial distress, inject capital, and use the Hong Kong shell. This practice was ended in 1992 by China's securities commission. The second early approach to Hong Kong allowed Chinese state enterprises to establish companies in Hong Kong which would issue "Red Chip" shares to be listed on the HKSE. By the mid-1990s, 39 Red Chip shares were traded there.

Next, the Chinese government allowed domestic trading in the shares of Legal Persons (see explanation below) which did not have full corporate status. Then it permitted designated companies to issue and list A shares to domestic investors. Shortly after, it designated companies to privately place B shares with foreign investors, mainly institutions, which could trade them on the two domestic exchanges, SHSE and SKSE.

In 1993, the government arranged with Hong Kong for the HKSE to list H Shares, issued by designated Chinese companies. China's arrangements for listings on exchanges elsewhere in the world (notably New York, Singapore, and Australia, with plans for London and beyond) are beyond the scope of this paper. The following table shows the distribution of A, B, H, and Red Chip shares among the three exchanges.

HK/China Exchanges:
Allocation of Chinese Shares

Exchange	Type of Shares (number, end-95)	Investor Group
Shenzen	A shares (112) B shares (23)	Domestic Chinese only Foreign only
Shanghai	A shares (184) B shares (36)	Domestic Chinese only Foreign only
Hong Kong	Backdoor listings Red Chip (39) H shares (17)	HK and global investors using the HKSE: 60/40 institutional/retail; 50/50 domestic/foreign (including PRC)

The government sets annual dollar quotas or ceilings for the total amount of foreign funds that companies can raise by issuing B shares. It then allocates this quota among applicants.

Legitimate opportunities to arbitrage the shares of dual-listed companies are limited. Identical shares are not cross-listed. One does not find the same company, for example, listing an A share on two exchanges, or a B share on two. Some companies list H shares in Hong Kong and A shares in China, but one would not expect identical prices since the markets that each type of share can tap differ so much. And indeed, the prices of H/A combinations issued by the same Chinese company show no sign of converging. Arbitrage between Hong Kong and China is practically non-existent. At an aggregate level, using stock indices for all A shares, all B shares, and all H shares traded on each market, one study found no linkages between A and B shares. It did find that aggregate H share returns in Hong Kong could predict aggregate B share returns on the SHSE.[8] At the same level of aggregation, the prices of A shares traded on the SHSE and SKSE were increasingly integrated.

[8] Guobo Huang, *China's Emerging Stock Markets: An Investigation of the Market Linkages*, unpublished paper, 1994.

2. Factors affecting integration

The **Chinese government** plays the starring role in supporting or blocking integration. Prompting this role has been the government's conclusion that Chinese enterprise needed to be able to tap foreign as well as domestic investors in equity. Equally important was the conclusion that domestic savings should only finance domestic enterprise.

Government decisions guided every step. The government permitted the establishment of the SHSE and SZHE. It decided on the share structure of companies: A and Legal Person shares for domestic investors only, B shares for foreigners only, and H and Red Chip shares for the HKSE. It determined which Chinese firms could list these shares, allocating different firms to different exchanges. It followed a form of triage: the strongest companies did not need funds, the weakest could not succeed on the markets, so the government selected firms in between the extremes. The government determined the timing and sequence of listings; firms listed H shares on the HKSE, for example, in three batches, not individually. The government also sometimes helped the firms listing H shares, at least, in order to improve their share trading price. If an issuer might otherwise be forced to report poor performance, the government might subsidize the firm's operations or even allow it not to disclose all information.

Supporting integration:

Hong Kong, as well as China, wanted H shares to be traded on the Hong Kong exchanges. HKSE accepted H shares in part because the exchange, though strong in service and property companies, lacked listings of industrial companies that China would supply. Hong Kong already listed most domestic firms that would qualify, so listings from China raised the prospect of dramatic growth.

The major change for Hong Kong was in its listing requirements. HKSE had to modify its listing rules substantially to permit H shares to trade. This included setting special standards for the issuers and exempting them from the common requirements.

To formalize the procedures for H share listings in Hong Kong, five entities signed a Memorandum of Regulatory Co-Operation in 1993: the two regulators, Hong Kong's Securities Futures Commission and the China Securities Regulatory Committee, and the three exchanges, HKSE, SHSE, and SZSE. The understanding included:

- Listing of H Shares: Chinese firms wanting to list on the HKSE needed the approval from the CSRC, five other government agencies, and then the Premier of China. CSRC later devised shortcuts to speed the process. Either Hong Kong or China could veto

the listing. Hong Kong law would govern the listed firm in order to protect investors. English would govern.

- Treatment of Backdoor and Red Chip shares: Hong Kong's SFC, after much discussion with Chinese regulators, required approval from China's State Council Securities Policy Committee (SCSC) before any more backdoor or Red Chip shares could be listed.

- Accounting differences were resolved by requiring that the published accounts for the last three years of the Chinese firms issuing H shares meet international or Hong Kong standards. This is not always achieved.

Underwriting and listing of each H share is sponsored by a leading international investment bank, legitimizing the issuer for the investors in the Hong Kong market. From mid-1993 to early 1996, the 18 new listings were sponsored by leading banks headquartered in the U.K.(7 listings), Hong Kong(4), U.S.(3), Japan(2), Singapore(1), and France(1). This international cast reflects Hong Kong's status as a major financial center.

The **private sector** also plays a role in integrating the regional markets. HKSE, the sixth largest exchange in the world ranked by trading, amalgamated four exchanges that merged in 1986. By 1995, the HKSE was internally integrated. The Shenzhen Stock Exchange was founded in 1990 to parallel the HKSE.

Trading times overlap substantially, since the three exchanges are in the same time zone.

Indexes exist for all Chinese shares:

- The Hang Seng China Enterprises Index consists solely of all H shares listed on the HKSE since 1993.

- The Bloomberg Red Chip Index of all Red Chips.

- The China Index: all shares listed on the SHSE and SZSE.

It is not clear that these indexes actually have an integrating effect. In the abstract, they allow investors to compare the relative performance of the various types of shares and allocate funds among them accordingly. This would affect relative supply and demand for all types, as well as pricing.

Barriers to integration

Chinese law and policy constrain integration in a variety of ways. Some rules limit movements of funds across borders. Others reduce the attractiveness of the security to investors. A third set of

constraints are technical, arising because of possibly profound differences in the way business is regulated and operates in China and Hong Kong. A few institutional differences hinder integration by making it hard for agencies to work together. These are described in the following paragraphs.

The most serious constraint is on cross-border flows. Foreign exchange controls limit cross-border capital movement. The securities market is still in the experimental phase, which means the Chinese government is unwilling to let it operate freely. The gradual roll-out kept the world at bay until quite recently. The sequence was, first, Legal Person shares, next A and B shares within China as the exchanges were established (Shanghai and Shenzhen in 1990), then H shares for HKSE in three batches from 1993-6, and N shares for the rest of the world.

Several government policies reduce the attractiveness of the investment, making the shares illiquid, and so constrain the market's growth. These policies include:

- Since the Chinese government sets and allocates quotas, issues and listings are not a function of the firm's financial need or its managers' decisions. As a result, the quality of the listed Chinese firms varies substantially, affecting investors.

- Chinese regulations require that the government own 60% of a state enterprise's shares, so only a minority of the company's stock can be listed. This contributes to thin trading or illiquidity, since so many companies open to foreign investors are state owned.

- Limited disclosure for B shares means illiquidity is a problem for B shares.

- Since H shares are not listed or traded in China, investors are wary and trading in Hong Kong is thin.

The technical differences separating Hong Kong and China are common among exchanges around the world.

- Different legal systems in Hong Kong and China create problems listing H shares on the HKSE. Hong Kong uses common law and China does not.

- Insider trading is penalized in Hong Kong but not in China (which still lacks a securities law). Hong Kong law would apply to trading in H shares, but it is not clear whether China would enforce penalties, such as the disqualification of a director, imposed by the Hong Kong regulator on the Chinese issuing company.

- Standard listing rules in Hong Kong had to be modified substantially to accommodate companies listing H shares.

- Languages differ. English is used for business and legal matters in Hong Kong, Chinese in China. The companies listing H shares had to disclose and report in English.

- Clearance and settlement is not a problem, given the segmentation, but could become one. HKSE now delivers the securities two days after the trade date (T+2), while for the SHSE and SZSE A shares are T+3 and B shares T+1. Payment is not in same-day funds on the HKSE, but is for SHSE and SZSE. If the same shares were traded in Hong Kong and on the mainland, these differences could create confusion.

Clearance and Settlement		
Item:	**HKSE**	**SHSE and SZSE**
Delivery of securities	T+2	A: T+3 B: T+1
Payment	Not in same-day funds RTGS* planned	Same day-funds (qualified DVP)
Central depository	Yes	Yes (for each)
Securities lending	Yes	No
* Real time gross settlement system		

- Systems for trading, like those for payments and clearance and settlement, are not a barrier among the exchanges because no opportunity exists to use them. If the opportunity did exist, some problems might crop up.

- Accounting standards in China are not comparable to those in Hong Kong.

- Commissions and fees vary, with Hong Kong's the lowest, SZSE's about double, and SHSE's slightly higher still.

Institutional differences among regulatory agencies do not appear to have created obstacles to use of the H shares, though they may impede more thorough-going reform. The Hong Kong Securities and Futures Commission (SFC) has much broader authority than the China Securities Regulatory Committee (CSRC).

Some of these constraints may diminish in the foreseeable future. China's currency is to become freely convertible by 2000. At that point, the status of the B shares will be reviewed, since Chinese residents will be able to trade in foreign currency. The return of Hong Kong to China in July 1997 should affect the cooperation among regulators even though the legal and regulatory systems are

supposed to remain discrete for the next fifty years. The future of the SZSE may be reviewed soon after the transfer.

D. MULTI-COUNTRY REGIONS: MID-EAST

In contrast to the accomplishments of the European Union, the Federation of Euro-Asian Stock Exchanges (FEAS) is just starting out. It is of interest for just that reason. FEAS consists of exchanges in 15 countries, listed below.

Federation of Euro-Asian Stock Exchanges	
Member Exchanges	**Market Cap (March 1996, $ Millions)**
Kyrgyz	$ 5
Moldovan	$ 25
Yerevan	$ 30
First Bulgarian	$ 51
Kazakhstan	$ 182
Ljubljana	$ 352
Zagreb	$ 890
Amman	$ 4,295
Bratislava	$ 6,037
Lahore	$ 7,968
Karachi	$ 9,903
Tehran	$ 12,265
Istanbul	$ 31,480
Tel Aviv	$ 34,797
Source: FEAS (1996)	

1. Degree of integration and trends

The effort is too recent to report integration.

2. Factors affecting integration

The initiative of the Istanbul Stock Exchange prompted the establishment of the FEAS in May 1995. The five largest exchanges account for 89% of the total market capitalization of all 15 exchanges. The goals of the Federation, in addition to encouraging cooperation to help members develop and representing members to other federations of exchanges, include integrating exchanges in the region so that they can list and trade securities issued in the region. This is of interest to our study.

To encourage cross-listing and trading among member exchanges, the FEAS proposes:

- cooperation and harmonization of practices;
- technological cooperation; and
- promotion of international operations among members.

A technical committee and a rules and regulation committee have recommended ways to standardize practices and exchange information. The technology committee, for example, proposed to establish a central data base in FEAS's Istanbul headquarters and design standard software giving members access. The rules and regulations committee recommended ways to standardize accounting, disclosure, and listing standards, and to harmonize trading systems and settlement procedures with a view to cross-listing.

The effort seems motivated primarily by Turkey's plan to create in Istanbul a regional financial center in which capital markets play an important part. The government proposes, within the Istanbul Stock Exchange, an international bond and equity market free of tax and restrictions on trade, in which the securities are denominated in U.S. dollars. Issuers would be based mainly in the Middle East, Central Asia, and Eastern Europe, the area occupied by members of FEAS and once occupied by the Ottoman Empire. It is interesting that Egypt was not included. Investors would be global. This is essentially an offshore euro-capital market. Despite formal protestations to the contrary, the Federation thus appears to be part of a broader Turkish initiative to which the Federation's success would appear to be tied.

V. INTEGRATION OF EXCHANGES IN SINGLE COUNTRY FEDERAL SYSTEMS

Federal systems encounter fewer barriers to stock exchange integration than do groups of contiguous states. With multiple exchanges that may be subject to rules that vary by state or province, they encounter enough of the same impediments to make their experience instructive for our study.

The following sections review the efforts of the U.S., India, Germany, and Canada to integrate exchanges within their borders. We begin with the most integrated, the U.S.

A. SINGLE-COUNTRY REGIONS: UNITED STATES

The U.S. boasts two national stock exchanges, the New York Stock Exchange (NYSE) and American Stock Exchange (AMEX), and five "regional" exchanges (Boston, Chicago, Cincinnati, Pacific, and Philadelphia).[9] Their market capitalization and listed shares in 1996 are presented in the following table. This paper examines the degree to which the New York Stock Exchange is integrated with the five regional exchanges. No NYSE-listed shares are traded on Amex.

U.S. Stock Exchanges (1996)

Exchange	Market Cap ($ bns)	Turn-over ($ bns)	Number of Listed Companies
New York	7,300	4,600	2,907
American	135	91	751
Boston	n.a.	60	n.a.
Chicago	n.a.	125	284
Cincinnati	n.a.	n.a.	n.a.
Pacific	n.a.	87	526
Philadelphia	0.34	n.a.	85

Source: Various exchanges. n.a.= not available

[9] We do not describe non-members of the NYSE that make markets in stock listed on the NYSE, such as Posit, Instinet, and the Arizona Stock Exchange. We do not report OTC transactions because this study examines only formal exchanges.

1. Degree of integration and trends

The extent to which U.S. stock markets are integrated depends on one's point of view. Compared to the limited integration even of the EU markets, and certainly of others in this paper, the U.S. markets are very integrated. Set against the goal of the U.S. Congress when it enacted the policy for the National Market System in 1975, however, U.S. markets are not fully integrated.[10] A longer perspective suggests dramatic integration, to the extent consolidation reflects integration, and suggests a likely trend for regions we examine. The U.S. exchanges consolidated drastically over the century. The number of U.S. regional exchanges fell from 100 in 1900, to 35 in 1935, 15 in 1965, and 5 by 1995 (Blume and Goldstein 1995). Strong evidence shows that trading in a specific security tends to centralize in a single U.S. market.

Cross-listing of NYSE-listed shares on regional exchanges is extensive, one indicator of substantial integration. As of 1990, Blume and Goldstein report, 1,442 shares listed on the NYSE were traded on other U.S. exchanges, with a total trading value of $1.3 trillion. The NYSE accounted for 85% of the total trading in these shares. The five small exchanges (plus the NASD) had percentages ranging from 0.2% (Cincinnati) to 5.5% (Chicago). Almost 75% of trading was in the top 250 companies ranked by market value. Most shares listed on a regional exchange are cross-listed, usually on the NYSE and often on other regional exchanges. The following table shows the NYSE-listed shares that are also listed on at least one regional exchange. For comparison, the total number of shares listed on the NYSE in 1990 was 2,284. Over half of these were cross-listed.

This concentration in the NYSE has existed for a long time. In 1981, shares listed on regional exchanges accounted for almost 10% of the dollar volume on all U.S. exchanges. Of this, 9% was cross-listed. Shares listed only on one regional market, and not cross-listed elsewhere, were less than 1% of the value of all listed shares (see Seligman 1984).

[10] Much of this section is drawn from M. Blume and M. Goldstein, *On the Integration of the US Equity Markets* (1995) [Blume and Goldstein], J. Seligman, *The Future of the National Market System*, 10 Journal of Corporation Law 79 (1984) [Goldstein], H. Scott, *Regulation of the Relationship Among European Union Stock Exchanges-Lessons from the United States*, unpublished paper, Nov. 22, 1996 [Scott], and J. Shapiro, *U.S. Equity Markets: A View of Recent Competitive Developments*, NYSE Working Paper 93-02 (Oct. 1993) [Shapiro].

Stocks Listed on NYSE and Cross-Listed on Regional Exchanges			
	Cross-Listed NYSE Shares		
Exchange	**Number 1990**	**Trading $ bn 1990**	**Trading Vol. bn 1993**
Total (100%)	1,442	$1,333	6.4
New York	1,442	84.8%	84.9%
Boston	1,176	1.4%	1.1%
Chicago	1,352	5.5%	1.4%
Cincinnati	458	0.2%	4.5%
Pacific	973	2.4%	2.2%
Philadelphia	1,151	1.1%	1.3%
Sources: Blume and Goldstein 1995, Shapiro Oct. 1993.			

Integration measured by pricing is more problematic. A high and growing proportion of trading in NYSE-listed stock is intra-quote. That is, the trading takes place at a price between the NYSE bid and offer, which is usually the best price. In 1993, 28% of all trades in NYSE-listed shares were within the displayed bid-offer spread. This is even more true when the bid-offer spread is more than 1/8th. In this case, the share of trades within the displayed quotes was 38% in 1982 and 66% in 1993 (see Blume and Goldstein 1995; Shapiro October 1993). At first blush, one might say this trend is a good sign of integration. But most of the trading inside the "best price" takes place in the NYSE. The bid and asked prices of the NYSE-listed shares traded on the five regional exchanges were inferior to the best prices for substantial periods of time. Much of the trading volume of non-NYSE markets takes place at bid and asked prices worse than the best displayed prices (Blume and Goldstein 1995).

The broader problem is that the U.S. national market system is supposed to allow any investor to take the best bid/ask price available at the time. The higher the percentage of trades within the displayed "best" bid and offer, the less opportunity for every investor to know the full range of prices, which is needed to get the best price. And the proportion of investors who lack this information and trade outside the best prices is much higher at the small exchanges than at the NYSE. The system described persists into 1997. In this sense, the U.S. exchanges are not fully integrated. The following section explores this in more detail.

2. Factors affecting integration

Factors promoting integration

In 1975, the U.S. Congress directed the Executive to develop an integrated national market system (NMS) for U.S. exchanges. Congress, finding that securities markets were important, saw that new ways to process data and communicate could enhance the markets' efficiency and effectiveness. The NMS would benefit the public interest to protect investors by assuring that:

- execution is efficient;
- competition among brokers, dealers, and markets is fair;
- information about quotes and transactions is available to brokers, dealers, and investors;
- brokers can execute orders in the best market; and
- investors' orders can be executed without a dealer's participation (subject to the previous points).

Congress concluded that linking all markets with communications and data processing facilities would improve efficiency, competition, information availability, and best execution.

The Securities and Exchange Commission (SEC) used this mandate to push the markets to continue implementing changes already underway due to earlier SEC policy. The entire process, one of give and take between regulator and exchanges, took more than 15 years and is, in a sense, still not complete. The SEC's initial proposals seemed to threaten the basic structure and profitability of leading exchanges, particularly the NYSE, and often the adopted solution fell short of the SEC's initial proposals. The major initiatives were:

- the consolidated tape to distribute the price and volume of every sale;
- the composite quotation system (CQS) to identify the best bid and asked prices;
- the intermarket trading system (ITS) to allow brokers to route orders to the market with the best prices automatically;
- integrated clearing and settlement; and

- elimination of certain restrictive trading rules applied by the NYSE.

The following sections describe these initiatives.

The Consolidated Tape. Until the consolidated tape was in place, the price of the last trade in shares listed on an exchange (the last sale price) was reported continuously by ticker tapes and electronic displays for the NYSE and AMEX, but not for the regional exchanges.

The consolidated tape reports the volume and execution price for each trade to all reporting entities (NYSE, AMEX, regional exchanges, and NASD) and distributors who sell the data over their own systems. Trades are reported through two networks, one for shares listed on NYSE and the other for shares with a primary listing on AMEX and the regional exchanges. Secondary listings are reported on the network for the primary listing.

Major issues had to be resolved to create the tape. The central problem was the extent to which NYSE and AMEX should benefit from their control over dissemination. Some of these issues also impeded efforts to develop common institutions in Europe, described above. The questions about the consolidated tape included:

- Would the data be provided by neutral outside vendors or the exchanges? An outside vendor would deprive the exchanges of income from disseminating last-sale data. The solution was to create an association controlled by the exchanges. It would collect and sell the data; other vendors could then resell.

- How much control could individual exchanges exercise over the association? Could the big exchanges--NYSE and AMEX--each have a veto? Gradually the association became less dominated by the big exchanges.

- How quickly must exchanges supply last-trade data to the association? Delays could undermine the tape's effectiveness. Even worse would be the effect of different lengths of time in the delays from various exchanges.

- How responsive should the association be to changing information technology used by purchasers? Slow transmission speed could benefit the major exchanges, which controlled the association, by lengthening the time it would take vendors to get and distribute the information. This would reduce the competitive impact of the vendors on the exchange. The SEC had to regulate this to encourage more responsiveness.

- When should the market of a sale be identified: only secondary markets for a stock, or no markets, or all markets? The SEC forced a choice between the last two.

- Should the system be designed so that it is easier for a broker to get data about individual markets or the consolidated markets? The SEC opted for the latter.

In short, the SEC found itself consistently opposing the oligopolistic tendencies of the dominant exchanges in order to create an effective consolidated tape. The process was long, partly because the SEC realized it did not know the best approach. The SEC started to call for a consolidated tape in 1967, saw an experimental tape in place in 1972, and the tape completely operational in 1976.

The Consolidated Quotation System (CQS). The SEC in 1973 announced that a broker should be required to execute an order at the best price. The CQS was to make that possible and easy.

Each market maker in the NYSE, AMEX, regional exchanges, and NASD must supply the CQS its bid price (and corresponding volume) and ask price (and volume) for the shares in which it makes a market. The CQS would sell the consolidated quotes to vendors who would in turn sell it on. The data would reveal the best bid and asked prices.

Issues to be resolved included:

- Should OTC trade data be included in the CQS? The SEC said inclusion was essential to promote competition.

- Could the system be designed in a way that did not cripple or destroy the NYSE's upstairs operations and market makers? The SEC wanted more competition among market makers.

- How could quotations be firm? Regional and OTC markets were particularly hard pressed because their prices were often a function of those of the big exchanges (and they would compete by reducing fees rather than the share price). The SEC resolved this in 1982 by requiring only the primary exchange to publish firm quotes and allowing the regional exchanges and OTC markets to do so at their discretion.

- How wide a range of data should vendors be required to distribute? The CQS allows several formats. A vendor could simply provide the highest bid and lowest asked prices or prices and volumes from all markets (provided it supplied similar data for each).

- Should the data be supplied only by specialists or by all members of the exchange? In 1982, the SEC opted for all members, which meant that the CQS would include the quotes from the crowd around the specialist's post.

Here, too, the process was slow. It took seven years to achieve a workable rule.

The Intermarket Trading System (ITS). Brokers routing orders that respond to the best prices need a fast, reliable trading system. Immediate execution, at the time the order is placed by the customer, is the ideal because it eliminates a second confirming call to the customer.

The ITS connects the floors of two exchanges so that floor brokers and specialists from one can send orders to market makers on another. The specialist or floor broker uses the ITS to send the market maker a commitment to trade that must be exercised within 1-2 minutes or it expires. This is not automatic execution.

Issues to be resolved included:

- Should a universal message switch be made available so that brokers could route an order automatically to the market that gave the best quote? The SEC decided against this. The ITS links market centers to each other. It does not link brokers to the market maker in other exchanges. The resulting system is described as crude.

- Should the market displaying the best bid or offer be the counterparty to a transaction at this price? The ITS does not require this. A market with an inferior price may choose to exercise at or better than the best price rather than transmit the order to the market displaying the best offer.

The SEC compromise protects specialists and floor brokers. This preserves the regional exchanges as potential competitors with the NYSE, so investors or brokers can direct their orders to regional exchanges in order to avoid a NYSE rule or practice.

Integrated Clearance and Settlement. In the U.S. today, 99% of all stock trades are cleared on National Securities Clearing Corporation (NSCC). At the time the NMS was founded, however, exchanges suffered from crippling back office deficiencies. Three different clearance and settlement entities existed side by side, offering similar systems to groups with overlapping membership. The duplication was expensive in time and fees.

The industry created, with the SEC's encouragement, a single entity called the National Securities Clearing Corporation to absorb the three existing entities. NSCC brought book entry processing, access to all broker-dealers and financial firms, and the ability to compare and settle all trades in the system. It allowed participants to put securities in custodial accounts with depositories. A participant could pay all clearing obligations once each day. Book entry transactions could be settled the same day.[11]

[11] See Scott 1996, 10.

The End of Certain Restrictive Trading Rules. The NYSE and AMEX each prohibited their members from making "in-house" agency crosses and principal transactions in stocks listed on the exchange. An unrestricted NYSE member could have acted as a market maker in NYSE-listed shares being traded on regional exchanges. The NYSE argued that its trading restriction made the NYSE market deeper and more liquid. In-house crosses would prevent the trades from taking part in the auction process, which gives access to the best price. The alternative was fragmentation, said the NYSE. But to no avail. The SEC decided in 1980 that trading off-board in exchange-listed securities could not be restricted. Its goal was to enhance competition between brokers and dealers.

Factors impeding integration

The systems for consolidated quotation and intermarket trading, which were designed to integrate U.S. exchanges, work together with the structure of the exchanges to frustrate that goal. The quotation system is the main impediment to full integration, according to Blume and Goldstein (1995). The narrowest spread the quotation system could report is 1/8. It often displays spreads of ¼ because traders on both the NYSE floor and non-NYSE markets have discretion when revealing their trading interests and executing orders. The system works as follows, according to Blume and Goldstein:

- Non-NYSE markets pay to attract order flow from specific types of customers (such as retail investors) and not others. The non-NYSE market maker displays bid and asked prices generally inferior to the NYSE best prices. It agrees to pay brokers for small retail investors 1¢ or 2¢ per share for order flow. When the market maker receives these orders, it displays either the best asked or best bid price, but not both. The market maker profits because the investor is not informed about the best price in the market.

- Non-NYSE markets attract order flow by allowing investors to avoid NYSE rules while giving the investor at least the best displayed price. One common example is the large block trade in the NYSE's upstairs market. It may be executed as a clean cross on regional exchanges if there is a chance that it could be broken up on the NYSE floor to meet orders already on the floor. Breaking could leave one side of the large trade not executed fully. A second example is the rule against short sales on the NYSE but not on a regional market.

- NYSE trading procedures significantly often lead to spreads above 1/8 because the transactions are complex. One example of several is the institutional investor's large order that gives the floor trader discretion about how and at what price to execute or not. The floor trader may not make a firm offer in order not to reveal his interest off the floor. He may partially execute the order by taking smaller opposite orders within the best quote. This would widen the spread if the takes all limit orders at a particular

price. CQS cannot display this accurately. It sometimes reports the best spread in these circumstances at even ¼.

- Non-NYSE markets attract order flow when the NYSE best spread exceeds 1/8 by displaying bid or asked prices within the NYSE spread.

- Much NYSE trading, when the displayed spread exceeds 1/8, takes place on the floor within this spread and is not revealed by the Consolidated Quotation System.

Price competition is laudable. The problem is that it occurs in ways not detected by the consolidated quotation system. Despite the Congressional mandate, many investors do not actually receive the best price because it is not captured by CQS.

One may ask why the SEC did not require brokers to adhere to a best execution rule making them seek the best price for multiply listed stocks. There are several explanations. Scott concluded that the SEC is skeptical that the best price can be readily determined, since auction markets often trade between quotes. A simple best price rule could perversely force a broker to route orders to better posted quotes from other markets when the NYSE offered trades between those quotes. Blume and Goldstein (1995) explain that the SEC wants floor trading and also wants the regional exchanges to remain as an alternative to the big exchanges, so it was unwilling to push for a best execution rule that, by centralizing, would eliminate the need for floor trading and regional exchanges. To integrate the markets, Blume and Goldstein say, the SEC could permit only limit orders to identify the best prices and market orders only to be executed against the limit orders. Since this could be done by computer, it would eliminate the need for trading floors. They note that computerized trading is not necessarily better than floor trading as practiced at the NYSE and that completely integrated markets may not be the highest goal of policy.

B. SINGLE-COUNTRY REGIONS: INDIA

India boasts 23 stock exchanges and an over-the-counter market, listing over 7,800 companies. Activity is concentrated in a few exchanges. The Bombay Stock Exchange, plus Delhi, Calcutta, Madras, and one other, account for more than 90% of listed companies and market capitalization. Bombay dominates in companies listed, market cap, and until recently trading, since the National Stock Exchange just captured the lead. All are regulated by the Securities Exchange Board of India (SEBI), established in 1988 and given wide regulatory authority in 1992. The following table gives basic information.

Leading Indian Stock Exchanges (1996)			
Exchange	**Market Cap ($ bns)**	**Turnover ($ bns)**	**Number of Listed Companies**
Bombay	123	26.6	5,999
Calcutta	137	3.5	3,199
Delhi	61	9.4	3,839
Uttar Pradesh	58	0.5	1,750
National Stock Exchange	66	69.4	535
Source: Stock Exchange Board of India (SEBI)			

1. Degree of integration and trends

India's markets are highly integrated in that exchanges list companies from all over India. Companies based in each of four areas in India list more on exchanges in the west (54% of total listings), which effectively means Bombay, than on exchanges in any other region, including their own home area. Their next most frequent listings are on exchanges in their home area. Thus companies based in the north list 26% of their shares on exchanges in the north, but only 13% in the east and 2% in the south. The following table shows the listing distribution across exchanges, grouped by areas in India, of companies from the same four areas in India.

Geographic Distribution of Listings by Home Area of Company and Area of Exchange

Exchanges Grouped by Area in India	Company's Home by Area in India				All Com-panies
	North	West	East	South	
North	26%	12%	17%	15%	17%
West	44	66	52	45	54
East	13	8	17	10	12
South	2	10	12	25	14
Unknown	5	4	2	5	3
Total	100%	100%	100%	100%	100%

Source: SEBI
To read this table: e.g., 26% of all listed companies based in north India are listed on exchanges located in north India. 17% of all companies listed in India are based in the north. north includes Delhi, west includes Bombay, est includes Calcutta.

A large proportion of the listings on the Calcutta exchange and NSE are cross-listed in Bombay, according to the International Finance Corporation.

In 1996, the market became even more integrated by our measures of cross-listing and arbitrage, as the fledgling National Stock Exchange of India (NSE) took the dominant market share of all trading. Having started trading only in 1994, NSE surpassed Bombay's daily trading average in November 1995, when it reported Rs. 2.6 billion and Bombay reported Rs. 1.8 billion. By May 1996, NSE's daily average was Rs. 11 billion to Bombay's Rs. 4.2 billion. Most of the shares listed on NSE had their primary listing on other exchanges, so cross-listing and resulting arbitrage opportunities increased dramatically. But integration is far from complete. A shake-out is underway in the number of exchanges that will realign stock markets in India.

2. Factors affecting integration

Factors impeding integration

Until the early 1990s, Indian exchanges were highly fragmented. Each had its own non-automated trading system and clearing house. Trading hours and holidays were not synchronized. Listing and margin rules varied by exchange, as did their practice toward marking securities ex-dividend, ex-rights, and ex-bonus.

Although Bombay had a national scope, the strategy of most exchanges emphasized local investors and companies despite the willingness to list companies from all over India, noted above. The Bombay Stock Exchange, established in 1815, dominated and grew more than the others since the 1980s. Bombay's draw for issuers was that it allowed them to reach the small concentrated group of financial intermediaries based in Bombay city that made up India's institutional investors. These included the Unit Trust of India, two large insurance firms, and three development finance agencies. Otherwise wealth and companies were disbursed across many major urban centers in India. Exchanges could and did target retail investors and companies in their area, rather than institutional investors based in Bombay. One sees this in the strategies of two of the largest exchanges. The Delhi exchange primarily targets companies in industrializing north India and investors in the wealthy Punjab. The Calcutta exchange offers investors deploying the old wealth of Calcutta a higher proportion of shares in companies from Eastern India than other regions. These local strategies created the fragmentation, which resulted in 1994-5 in 12 of the 23 exchanges each having less than 1% of all trading. One might conclude that consolidation will reduce the number of exchanges, as it did in the United States.

Factors promoting integration

The government, through SEBI, took the lead after scandals clouded the integrity of India's stock exchanges in the early 1990s. It drafted a comprehensive stock exchange law that set standard rules, such as minimum listing requirements, for all exchanges. Perhaps equally important, SEBI oversaw the creation in 1993 of a different kind of stock exchange: the National Stock Exchange of India (NSE).

NSE is based in Bombay, national in scope rather than regional, and technologically advanced. It is dominated by corporate members--leading financial institutions account for 72% of all members--and run by their professional managers. No existing exchange had more than 16% of its membership corporate (Bombay had only 4%), and all were run by the brokers.

NSE provides nationwide on-line screen trading with market makers and electronic clearing and settlement. Its main goal is to allow investors to trade securities from anywhere in India. Equity trading

started November 3, 1994, debt trading five months earlier. NSE charges members a refundable deposit that is about 20% of the cost of a seat on the Bombay exchange. It welcomed those already holding seats on other exchanges. Most of the leading brokers in India joined. It cut prevailing spreads 75% and fees 50%. Its brokers do business directly with customers, while other exchanges, like Bombay, used sub-brokers who added an extra layer of work and fees. Transactions on the NSE are scripless and executed within minutes, compared to the weeks it takes on other exchanges.

The competitive impact has been most severe on exchanges other than Bombay. Some report volume losses between 50% and 75%. They responded by seeking niche markets in particular industries or commodities.

Bombay met fire with fire. It reformed its multi-layered trading methods. It proposed to expand its trading floor. It adopted the Bombay On-Line Trading system (BOLT), designed to be open to other exchanges. This was to create a southern regional grid. Bombay claims the federal government delayed BOLT's spread across India in order to favor NSE.

NSE's rival exchanges recently proposed creating their own national market.

Government support for NSE, beyond delaying its rivals' responses, set minimum capital standards for central depositories that allowed only the NSE to establish one. The standards effectively precluded plans by each of several other exchanges to establish a depository.

SEBI did not rely solely on competition from NSE to improve the exchanges. It directly pressed all to modernize. It required each to outline strategies to update their systems through increased computerization.

In short, the federal government promoted integration by improving regulation, pressing exchanges to modernize, and most important, creating a nation-wide competitor largely owned by state-owned financial institutions. The NSE's strategy integrated markets directly and, by prompting a response from the other exchanges, indirectly. The competitive effect was immediate and fundamental.

C. SINGLE-COUNTRY REGIONS: GERMANY

In existence since as early as 1585, Germany's stock exchanges now number eight and are located in Frankfurt, Dusseldorf, Munich, Hamburg, Berlin, Hanover, Stuttgart, and Bremen. They only began to integrate deliberately and seriously in the late 1980s. Frankfurt increasingly dominates. Its share of equity trading or turnover on all exchanges rose from 53% in 1987 to 79% in 1996. In the same period, total turnover value trebled from $472 billion to $1,141 billion. The medium-sized exchanges are in Dusseldorf and Hamburg. Overall, German equity markets are relatively small, given the size of the economy. In 1996, total market capitalization was $577 billion, according to the International Finance Corporation.

1. Degree of integration and trends

The German exchanges are integrated when measured by the cross-listing but not when the measure is pricing.

Cross-listing is substantial. A quick review suggests that most large international German firms are listed on Frankfurt and the seven other exchanges. To cultivate market niches, the small exchanges trade securities issued by medium and small companies based in the region served by the exchange. These are not cross-listed.

Prices of a cross-listed security often vary among exchanges, though the differences should be narrowing with the relatively new computer-based systems linking the exchanges. Studies in 1995 found that from 10% to 20% of prices on the Frankfurt Exchange floor were outside the spreads on the computerized trading system, IBIS.[12] Our check of the prices of a small number of major German companies on several exchanges revealed large spreads. Some of these price differences may be due to the different costs in using exchanges; at least one exchange levies no fees, for example. The limited literature, however, suggests that arbitrageurs do not successfully equalize prices across the exchanges.

2. Factors affecting integration

Factors limiting integration

Working against integration are the traditional unimportance of equity markets, which allowed Germany to tolerate an inefficient structure, the inertia of that structure, and certain non-financial advantages that accrue to issuers with multiple listings.

German share trading is segmented and opaque due to several factors.[13] Some 30% of trading in German shares take place off-exchange, by phone. Since exchange hours are only from 10:30 am to 1:30 pm, this high portion makes sense. But phone trades are not official and never published, so much of the trading is secret. Second, the electronic trading system IBIS extends only to the most frequently traded shares (first the top 30, then the top 100) and is available only to stock exchange members, banks and brokers. Trading mixes order- and quote-driven systems. The electronic trading system IBIS allows only one-way quotes, making it quote-driven, but bank traders and brokers can make proprietary trades, giving an element of a quote-driven dealer system. Banks split large lots between

[12] Benn Steil, The European Equity Markets (1996) (Steil) at 17.

[13] Steil at 18.

IBIS and the floor for better prices. Third, the majority of shares, smaller than the top 100, trade on the floor and lack transparency as a result. Fourth, the financial intermediaries must specialize, creating further segmentation. Only banks can offer shares to the public. Only Official Brokers (*Kursmakler*) and Independent Brokers (*Freie Makler*) can operate on the floor of an exchange.

At the heart of this inefficient structure is the *Kursmakler*. Steil describes it well:

> ...German floor trading features a limit order book for each stock, providing an auction market base, although 'specialist' broker-dealers (*Kursmaklers*) manage these books while trading for their own account, thus adding a significant dealer component. Each stock is assigned to only one *Kursmakler*, though each *Kursmakler* can be responsible for multiple stocks. Orders may be routed to the *Kursmaklers* during floor trading hours either directly on the floor, or from remote locations through...[an] electronic order routing system.
>
> The limit order book is open only to the *Kursmaklers*; this informational advantage allowing them to quote more narrowly for their own account than other dealers. *Kursmaklers* also receive a [commission but]...they do not have the affirmative trading obligations of New York Stock Exchange specialists, and are therefore more accurately described as privileged market makers than as specialists.[14]
>
> The *Kursmakler* thus plays a central role in pricing, which takes two forms on the exchanges. First, domestic stock not traded continuously is priced about 1.5 hours into a session (i.e., about noon) by its *Kursmakler*, an Official Broker of the exchange that is like a market maker but is not obliged to buy. Second, continuously traded shares have variable price quotations. In this case, at each exchange the *Kursmakler* for each security sets its opening price to balance the most orders received before trading starts.

The big banks both integrate and further segment the markets at the same time. They do so because each bank can create internal markets inside the bank. They can provide many related services, supplementing their monopoly on retail brokerage with credit and other services because they are universal banks. They operate nationwide and are members of all exchanges. They can make in-house trades, settling buy and sell orders for the same stock among their own customers, off the exchanges. Thus they can integrate markets internally. But despite their privileged access to the exchanges, the banks are limited by the *Kursmaklers*' special role. Banks must notify the *Kursmakler* for the stock of any net position they hold in the stock and work through the *Kursmakler* to settle that net position. Ultimately this structure perpetuates stock market segmentation despite the banks' cross-cutting role. The banks' internal markets are yet another market segment and their bids, offers, and transactions need not be public.

[14] Steil at 17.

Germany could tolerate this inefficient structure for a long time because its capital markets were traditionally unimportant. Not only did the financial system favor banking over capital markets in general, but taxes discriminated against equity income. Germany, for example, ranked last in Europe for initial public offerings in 1995. Only 20% of German joint-stock companies have gone public. Most listed shares are illiquid; only a handful trade actively. The number of listings is low. Largely unlisted small and medium-sized companies account for over half of the country's industrial production and 2/3 of all jobs. Many of these *mittelstand* firms are undercapitalized, so find it hard to raise funds in securities markets. Institutional investors are limited, so not a force for more efficient markets. Pension funds are not significant, since German companies pay pensions from their own funds. Insurance companies are the major institutional investors. Individuals are very conservative investors; only 6% of the population held shares in mid-1995.

Firms list on multiple exchanges to develop relationships with local investors and consumers. A firm's primary stock market is the exchange in the region where its head office is located; when a firm reports its stock price, it uses the primary market. Listing on secondary markets seems to be a useful way to augment liquidity by tapping the regional markets, as well as a part of the firm's marketing and relations with state governments, since listing suggests the firm is a good citizen. The 1994 effort by BASF, the large chemical and plastics conglomerate, to delist from the seven provoked such a firestorm of protest from regional brokers and exchanges that the company remained listed on all. Other firms seem to believe the cost of negative publicity would outweigh the advantages of delisting, lower fees, and greater liquidity in the main market.

The resulting decentralization of stock markets to the provincial level proved hard to change despite the revolution in equity markets elsewhere in the world during the 1980s. Vested interests were strong, not only in the private sector but in the supportive state governments.

Factors promoting integration

After the Big Bang in the U.K., Germany's government and big banks saw London take the dominant share in trading derivatives on the bund, the German government's key security. They realized they needed to modernize at home. The Maastricht Treaty goaded them to further action.

Government policy shifted, promoting Frankfurt as the center of Finanzplatz Deutschland, which it announced in 1992. A complex process began by which the government sought to change the rules of the game in a way that would give German equity (and derivatives) markets the scale and depth at least equal to any other European capital market and, they hoped, also equal to London. Since seven other exchanges in other German states stood to lose a lot, the process had to be carefully managed.

The main steps toward integrating the German exchanges are described below in chronological order. They were to:

- centralize by establishing a national exchange owned by all eight and a central clearance and depository bank;

- standardize by creating a structure for all exchanges and common rules for trading, including insider trading, across all the Lander (states);

- write more transparent rules;

- integrate by creating systems for trading across all exchanges and, through a cooperative agreement among the four largest exchanges, create uniform pricing of cross-listed shares, consolidate trading of the most active shares, and automatically match bids and offers;

- automate by bringing full electronic trading of key securities in Frankfurt and making Deutsche Borse more efficient; and

- add depth by creating a NASDAQ for Germany.

Efforts to rationalize, by trying to close some of the regional exchanges, failed.

A chronology of policies. The sequence of the new policy roll-out is of interest. The change could not be accomplished immediately, as a kind of German Big Bang. The order of change seems to reflect trial and error rather than a considered sequence. The major reason, one can surmise, is the politics underlying what will probably end up as a profound shift in the roles of all exchanges and possibly the existence of several. This can instruct efforts in other regions.

1989:

IBIS (Inter-Bourse Information System) was established as an electronic trading system for the 30 most liquid securities on the exchanges. (Later 70 shares were added.) The major German banks started IBIS for the Frankfurt exchange alone. The other exchanges first countered and then, under pressure from the Bundesbank (which wanted Frankfurt to host the European Monetary Institute), joined an improved version of IBIS in 1991.

1992:

Finanzplatz Deutschland: Finance Minister Waigel's plan of January 1992 set policies to bring German markets up to equal status with New York, London, and Tokyo. Insider trading would be a criminal offense. Corporate conduct and performance would be more transparent. A "central stock exchange" would serve the eight exchanges. Technology would be used more widely.

1993:

Deutsche Borse was established in January, the seven exchanges having agreed to cooperate with Frankfurt in April 1992. Deutsche Borse owns Frankfurt Stock Exchange (FSE) and DTB. The large banks, having owned FSE, became Deutsche Borse's majority shareholders, holding 81%. The seven smaller exchanges own only 10%. Official and Free Brokers own 6%. A goal of Deutsche Borse is to bring all major trading under its wing, which could greatly reduce the role of the seven smaller exchanges.

DKV (Central Clearance and Depository Bank) was established.

1994:

Regulatory initiatives moved German exchanges closer to integration while protecting key groups. The Securities Trading Act, effective July 1994, as amended August 1994 by the Second Financial Markets Promotion Law regulates all trading, on and off exchanges, including insider trading. It created the Federal Securities Supervisory Office. It regulates the intermediaries' conduct. The Second Law responds to EC Directive 89/592 about insider trading. These laws:

- extend market supervision to the Lander (states);
- direct trading to the investor's home exchange unless the investor requests IBIS or another exchange;
- impose a common structure on stock exchanges;
- regulate IBIS and its competition with trading floors;
- expand the activities of Official Brokers;
- facilitate lending of securities and their use as collateral by exchanges; and
- establish a depository for prospectuses of all unlisted shares (previously left to the states).

The Second Law forced states like Bavaria and Bremen to close their Insider Trading Commissions and to create a Trading Supervisory Board and a Takeover Panel.

Zeus 1--unofficial--was a plan, since scuttled, to rationalize the exchanges, closing some and assigning regional specialties to the others. The public learned that Deutsche Borse was considering a plan to close the exchanges of Hamburg, Stuttgart, Bremen, and Hanover. The plan would give Frankfurt exclusive trading in the 100 largest securities (equal to 90% of all trading volume in 1994), and assign to Dusseldorf the securities of companies in central Germany (plus warrant trading), to Berlin north German firms, and to Munich southern firms.

The seven small exchanges opposed this, while accepting the need for uniform opening, spot, and closing quotations across exchanges.

BASF, one of the 15 largest German corporations, announced its intention to delist from the seven small exchanges in 1994 in order to centralize trading on Frankfurt. Public opposition was great. By December 1996, it was still listed on all exchanges and the price was remarkably uniform.

1995:

Cooperative Agreement of Frankfurt, Dusseldorf, and Munich. The goal was to combat "market fragmentation" and foster "efficient, transparent, and uniform pricing," while listing more small and medium sized firms. By the end of the year, only Berlin had joined the three. A major motive for the Agreement was that foreign investors interested in large blocks with uniform prices were turning to London for German shares. The exchanges would:

- create a uniform pricing system for all shares listed on the three exchanges so that there would be one price at opening, cash settlement, and close.

- consolidate all trading of the top 30 German blue-chip stocks in Frankfurt.

- consolidate trading of the next 70 firms in the issuer's home exchange if the exchange is a party to the Cooperative Agreement.

- use IBIS to match directly bids and offers entered as quotes by Official Brokers.

One effect was that the Bavarian exchange assumed management of the computer center previously run by the DWZ, Deutsche Borse's securities data and service company. Munich now prints all data. This job appears to be a benefit given to Munich for participating in the Agreement.

Zeus 2--official. Deutsche Borse's more recent strategy, costing about $220 million over four years, has three phases:

Phase 1. Full electronic trading of "key" securities in Frankfurt. This would replace Official Brokers with the *Betreuer*, even more akin to market makers. The brokers and all seven small exchanges opposed this phase.

Phase 2. Create a European trading platform for blue-chip stocks.

Phase 3. Regroup Deutsche Borse products to increase transparency and efficiency. Deutsche Borse plans three divisions that will become subsidiaries: Benchmark Products (the liquid markets), Domestic Products (including a market for young fast-growth firms), and Operations-Based Services (clearance, settlement, and other services).

This strategy would push the smaller exchanges to focus even more on the non-DAX securities (outside the top 100 in the index), which are much less liquid and thus riskier.

Neuer Markt. Deutsche Borse is creating a NASDAQ for Germany, subject to standards set higher than those in the EU Investment Services Directive for regulated markets. Liquidity Sponsors will, like market makers, be responsible for quoting bid and ask prices on request and be the preferred trading partner in the stock. Deutsche Bank believes that a very liquid and transparent market will attract investors. The state of Hessen (in which Frankfurt is located) will help. The New Market had not yet opened in December 1996.

Deutsche Telekom. Its shares were listed on all eight exchanges, indicating that the practice of cross-listing was still very much alive.

By 1996, systems for data, trading, and clearance and settlement were helping to integrate the German exchanges.

Securities trading. The buyer's and seller's brokers, which may only be banks, use Official Brokers to transact trades on the exchanges through either floor or computer-based trading. Floor trading is described above, in terms of the *Kursmakler*. In Germany, computer-based applications for trading are developed and distributed by a Deutsche Bank subsidiary, DWZ (*Deutsche Wertpapier daten-Zentrale Gmbh*). DWZ manages an information system, an electronic order routing system, a trading system (for 100 stocks), a settlement data system for exchange and OTC transactions, and a system for trading supervision across all eight exchanges.

- The information system called TPF (Ticker Plant Frankfurt) gathers from the eight exchanges, IBIS, and DTB and distributes real-time rate and price information. DWZ manages this.

- BOSS-CUBE (*Borsen-Order-Service-System*) directly routes electronic orders from the investment advisor or trade site to the appropriate Official Broker or Free Broker's order ledger. BOSS records all steps from order to settlement in a format that can be retrieved online. It processes about 50,000 orders daily.

- The trading system IBIS (*Integriertes Borsenhandels- und Informations-System*) lets exchange participants (banks and brokers) place buy or sell orders or accept quotations offered on their terminals. IBIS products include the DAX 30 securities and another 70 shares, plus warrants and bonds. It qualifies as a regulated exchange. IBIS trading hours last 2 hours longer than floor trading. Matching is not automatic. DWZ manages IBIS. IBIS accounted for 34% of the total turnover (market value) of the 30 most liquid shares by 1994 and almost 40% by October 1996. IBIS accounted for 29% of all domestic share turnover in 1994.

So impeding price integration are continued floor trading and the absence of automatic routing. Deutsche Borse keeps pushing to end floor trading, automate routing, and achieve one price. The seven smaller exchanges, with the Official and Free Brokers, see such moves as a threat to their existence and oppose them.

The settlement data system for exchange and OTC transactions is BOEGA (*Borsen-Geschafts-Abwicklung*), which helps banks and brokers document transactions automatically. DKV reviews BOEGA's work as a control mechanism.

Clearance, settlement, and payments. Clearance and settlement now promotes, rather than impedes, integration of the stock markets. In 1993, the creation of the Deutsche Borse brought centralized clearance, settlement, and custody. Deutsche Borse wholly owns the Central Clearing and Depository Bank (DKV, the *Deutscher Kassenverein AG*), a Systems House (DWZ), and the International Securities Center (AKV, the *Deutscher Auslandkassenverein AG*). DKV has branches at seven of the eight exchanges; the Bremen exchange uses the DKV's Hamburg branch. Participating in DKV are German banks and brokers.

Most securities are immobilized. DKV holds 90% of traded securities. Owners have a collective interest in the securities DKV holds in custody. Banks are custodians if their clients request them to hold securities outside the DKV; this is done for some registered shares and shares traded on the Free Market. Otherwise, the law requires banks to place securities with the DKV.

DWZ, the Systems House, supplies the accounting services for a network that links all exchanges, the branches of the DKV, and the AKV.

Electronic national securities clearance and settlement occurs through a system called CASCADE (Central Applications for Settlement, Clearing, and Depository Expansion), introduced in 1991 to replace a computer-based system operating since 1970. The system, run by the DWZ computer center, links stock exchanges, banks, and DKV. The following two paragraphs describe a typical trade in which the securities are in central custody with DKV.

Official Brokers enter the data into one of the two DWZ electronic data processing systems, BOSS for floor trading, IBIS for computer trading. Official Brokers confirm the trade to the broker-banks and confirm the data on paper or electronically during or at the end of the day. DWZ processes and records the data and issues vouchers. Trades are matched on the trade day (T).

Settlement is on T+2, according to the rules of all stock exchanges, and follows the same procedures whether the trade was on the floor (BOSS) or by computer (IBIS). When securities are held centrally, on T+1 each DKV member--Official Broker or bank--receives a delivery report of all trades and identifies any that are not to be settled on T+2. Each DKV member has two accounts at the DKV, one for securities and one for funds. Settlement on T+2 occurs when, for each transaction, DKV debits the securities account and credits the payments account of the seller's broker-bank and does the reverse for the buyer's broker-bank.

This system provides DVP among Official Brokers and the broker-banks on T+2. On that day, the DKV credits the stocks to the account of the buyer's broker-bank and the funds to the account of the seller's broker-bank. DKV instructs local offices of the Bundesbank to settle the daily cash account balances of banks involved.

When securities are in separate custody, the seller's bank gives settlement instructions to DKV and delivers the physical securities without involving DKV. Payment is through DKV. When trades take place outside the stock exchange, a real-time system settles either on the same day (T) or overnight (T+1). Both appear to provide DVP.

D. SINGLE-COUNTRY REGIONS: CANADA

Canada's five exchanges operate as non-profit organizations owned and run by their member broker-dealers. In size, the Toronto Stock Exchange (Toronto) dominates; it ranks about tenth in the world by turnover, according to the IFR Handbook. Winnipeg is tiny. The exchanges were founded between 1874 and 1913. The following table gives basic data.

Canadian Stock Exchanges (1996)

Exchange	Market Cap (US$ bns)	Turn-over (US$ bns)	Number of Listed Companies
Toronto	666.5	300.2	3,265
Montreal	537.7	49.7	545
Vancouver	14.7	11.9	1,495
Alberta	n.a.	n.a.	n.a.
Winnipeg		0.5*	61*

Source: Various exchanges and IFC * as of 1995

1. Degree of integration and trends

Cross-listing is substantial. Virtually all senior Canadian companies are listed on both the Toronto and Montreal exchanges. Seventy percent of Montreal-listed shares are also listed on the Toronto Exchange. The Vancouver Exchange lists 1,499 companies of which 139 are cross-listed with Toronto, 61 with Montreal, and 24 with Alberta. Measured by cross-listing, the Winnipeg Exchange is the most integrated. Of its 61 listed companies, only 19 were exclusively listed on the Winnipeg Exchange and the remaining 42 had primary listings on other exchanges.

Intra-region arbitrage is difficult to determine from the secondary literature. Arbitrage opportunities for shares listed on both the Toronto and Montreal exchanges appear to be negligible. We would expect this, given the automatic trading system that serves both exchanges (see below). But it does not serve the other exchanges. We do not know if arbitrage opportunities exist there.

2. Factors affecting integration

Factors that increase integration

Private initiatives integrate Canadian exchanges. The following paragraphs describe these initiatives.

Issuers cross-list to attain wider distribution and recognition. These facilitate later primary issues by the same company.[15]

Exchanges cooperate. The Toronto and Montreal exchanges share an automated trading system, established in 1983, that continuously monitors all equity trading on both exchanges. Since 1983, it automatically executed all market or limit orders up to a predetermined level. In 1990, the system expanded to include an electronic order book to automatically route, match, and confirm market and limit orders. Trading desks at member firms' offices across Canada have direct-access terminals for screen trading. Toronto and Montreal share a central depository.

The other exchanges do not share automatic trading systems. However, the Montreal Exchange is developing a software program to give traders access to markets across Canada. The program combines trading, dynamic order management, market information, and corporate and historical information. It links to back office and risk management systems.

The financial intermediaries, notably broker-dealers, operate nationwide. They could create their own intra-firm systems to integrate their trading on the exchanges.

Provincial laws, though a barrier to integration as described below, are not completely different from one province to the next. Ontario's 1966 securities law was adopted by the western provinces as well. Its ongoing disclosure rules, enacted in 1978, have been adopted in the Western provinces, and some eastern provinces. Quebec, governing the second largest exchange, Montreal, has a somewhat different system. Thus most provinces with exchanges have common rules for trading.

Securities regulators from each province have been **meeting annually** since the 1950s to coordinate policy. Their ostensible goal is an efficient nationwide market. Their hidden agenda may be to forestall federal regulation.

It may be that the laws governing securities markets in Canada's large **southern neighbor** successfully exert pressure for uniformity or at least broad similarities among the Canadian provinces'

[15] Forbes and Johnson, Canadian Companies, and the Stock Exchanges.

regulations. The SEC applies its Multi-Jurisdictional Disclosure System (MJDS) to Canada only. The MJDS allows Canadian issuers to meet U.S. disclosure standards by giving the SEC their Canadian registration material rather than the standard U.S. disclosures. The U.S. does this because Canada's laws are very close to those in the U.S. To the extent that any Canadian province wanted to allow its issuers access to U.S. securities markets, it would have to keep its securities laws sufficiently similar to the U.S. rules. If each provincial legislature operated according to the same concern, their approaches to securities regulation would be similar even though they might not have consulted with one another at all. Competition with U.S. exchanges could push Canadian law in a similar direction. A major argument for a national Canadian system is the fear of losing business to foreign exchanges.

Factors reducing integration

The biggest barrier to integration is **Canada's constitution**. It gives each province power over property and civil rights within its borders. The provinces and courts have interpreted this to include securities regulation. So Canada has a system of provincial law and regulation to govern securities markets even though it has a nationwide banking system. A stock exchange must be recognized by its province's securities commission in order to operate there. Despite many attempts to write a national securities law, the federal government has been unwilling to act. Several constitutional provisions, such as the trade and commerce clause, arguably clothe it with sufficient power.

Repeated **pressure for a national securities law and commission** reflects the tug-of-war between protagonists of integration and the provincial exchanges' desire for protection. Detailed proposals for a nationwide law and regulator were formally made by various commissions in 1964, 1967, 1979, and 1994 and were rejected. A new proposal is being considered in 1996-7.

Accounts of the efforts to produce a national law do not include analysis of the degree of integration and rarely put price tags on the costs and benefits of the existing system of provincial regulation. One estimate did find that multiple registrations in several provinces are expensive. The costs included:

- if a company with a security listed on one exchange seeks to list in another province, the cost of complying with the new province's rules averages C$20,000 and for 20% of the companies may run as high as C$100,000 if staff must be added;

- the cost of professional advice and registration fees in all provinces (other than the primary one) is C$35,000; and

- compliance costs would be reduced by as much as C$10,000 a year if a national commission replaced the provincial ones.[16]

[16] J. MacIntosh, A National Securities Commission for Canada? (1996).

Presumably these multiple costs would discourage cross-listing. Proposals for national law face the big operational problem of balancing the roles of existing provincial regulators and the proposed new national one. The following list[17] shows the type of issues these proposals try to resolve:

- the degree of rule-making power given to the national commission and the degree to which exchanges would be allowed to tailor listing standards to their target markets (e.g., big or small firms);
- whether the national commission should be self-funding;
- delegation as a device to avoid duplication among the provincial and national agencies;
- mechanisms for legislative uniformity among provinces;
- centralization of enforcement; and
- mutual recognition.

An effort to **harmonize securities laws** in five provinces in the 1970s failed. Five provinces--Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia--adopted a uniform securities law. Since that time, legislators in each province amended their law incrementally so that by the 1990s each province's law differed significantly from the others.[18]

The **exchanges' strategies** affect integration by segmenting the markets. Toronto and Montreal both list the largest Canadian companies, so rather than force an issuer to choose between them, they integrate with each other, but less with the remaining exchanges. Vancouver's niche is venture companies, smaller companies, and resource-based issuers; these companies would often fall below the size of those listed on Montreal or Toronto, so would not have the opportunity to cross-list there. On the other hand, they could be interested in and eligible for cross-listing on Alberta.

Clearance and settlement is not nationwide. A central depository serves Toronto and Montreal. Another serves Vancouver and Alberta.

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[17] See J. Martel, Comments, in E. Waitzer and A. Sahazizian, Coordinated Securities Regulation: Getting to a More Effective Regime (1994).

[18] See J. MacIntosh, International Securities Regulation: Of Competition, Cooperation, Convergence, and Cartelization (1995).

VI. CONCLUSIONS AND POLICY IMPLICATIONS

The following points emerge from this study that can help guide policy toward developing stock markets in a region, whether of contiguous countries or within a country.

Reducing barriers. Many barriers impede integration of stock markets in a region. Many barriers are official. Removing these creates an opportunity to integrate.

Many other barriers are found in market practices, imposed by the players. Some market barriers result from monopolistic or oligopolistic practices. Removing these also creates an opportunity to integrate, but does not necessarily lead to fully integrated markets. In 1976, the SEC made the NYSE and AMEX end their rules against the trading of their listed stock on the other exchange. By 1982, AMEX trading of NYSE-listed shares was "0.0%" of the NYSE volume. Cross-listing had not taken place despite the end of rules that segmented the markets.

Some market barriers result from market structure or dynamics that government action may not readily or perhaps appropriately change. Perhaps the SEC cannot identify the way to determine the best price. It should not make the choice for one or multiple exchanges between floor trading and automated trading by computer. The markets should do so. Perhaps issuers want multiple exchanges to exist so they can reap the benefits of listing on several. Efficient share pricing is only one goal. This is the German story. Despite the pressure to centralize (in Frankfurt), big firms list, and stay listed, on all eight exchanges.

Removing barriers is not the whole story. Regulations may need minimum standards, if not harmonization, across the countries in the region. The European Union's capital adequacy directive is an example. Institutions are needed to link the exchanges.

Common minimum regulatory thresholds, though perhaps not harmonization, emerge as a valuable way to make the playing field a bit more even. Here is an important role for government action. Regulatory differences created significant barriers in many of the regions we examined. On insider trading, exchange structure, and other matters, Germany had to impose a common approach on all states. Solutions in the EU include common approaches to exchange controls, internal markets, and prudential regulation (at least capital adequacy and listing standards) in the EU. The greater integration of EU exchanges compared to other multi-country regions suggests the value of common regulatory standards. So does the greater integration of the single-country regions compared to the multi-country regions. However, this should not imply that it is essential to have uniform law. Canada's decades-long failure to harmonize provincial laws or create a national securities commission contrasts with the high degree of integration as evidenced by cross-listing on Canadian exchanges. Perhaps neither harmonization nor a common regulator is essential for integration. On the other hand, prices in Canada do not appear to be fully integrated, so we should not exaggerate this lesson in regulatory humility.

Essential linking institutions should encompass all exchanges (and OTC markets that trade exchange-listed shares) and require complete data sets from all in the same time period (which could be as short as 1 or 2 minutes). These institutions should provide, in an ideal world:

- consolidated quotation data so investors can identify the best prices being offered;
- consolidated trading data so investors can know the price and volume of all executed trades;
- a trading system that permits orders to be executed fully when they are taken; and
- integrated clearance and settlement.

No region we examined has all these essential institutions. The U.S. comes closest.

Government-sponsored initiatives to create these essential linking institutions often founder on market realities. Despite its goal of a fully integrated national market, the SEC was not prepared to make fundamental choices about trading systems. Indeed, the SEC left the initiative to the exchanges. The EU has a poor track record on its many initiatives, which often collapsed when a member exchange withdrew to protect its competitive interests.

No single-or multi-country region has laws that make full integration the unequivocal goal and are enforced. The SEC did not go far enough in 1976, allowing instead a system that limits competition.

Once such constraints to integration as official barriers and monopolistic practices are removed, trading systems constitute the principle hindrance. This is the U.S. story: Congress and the SEC removed the other constraints, only to discover that the U.S. exchanges would not fully integrate because of the trading system.

Government can play a role facilitating or prodding the private sector. The U.S. stock exchanges are much more integrated than those of other regions because of SEC policy 20 years ago. The SEC prodded the exchanges through threats of more extreme action. The EU's most recent modest initiatives look promising.

Finally, India's NSE has integrated the Indian market, though not fully, at the initiative of SEBI and with its help. This is a very different approach from the others we saw. The closest example is the failed Nordic initiatives to create a Nordic exchange, which foundered on the unwillingness of member countries to relinquish their national exchanges. No single- or multi-country region other than India has been prepared to promote a new exchange that would displace and possibly make obsolete existing exchanges. India acted to resolve a crisis. Short of a crisis, it may prove impossible for most regions to

follow India's example. For multi-country regions, efforts by governments to create a regional exchange would be a waste of money.

In sum, the most promising areas for government leadership are:

- Removing official barriers;
- Removing market barriers resulting from monopolistic or oligopolistic power;
- Harmonizing or providing a common threshold within the region for prudential and structural rules; and
- Allowing or encouraging the private sector to take the initiative in building essential linking institutions.

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